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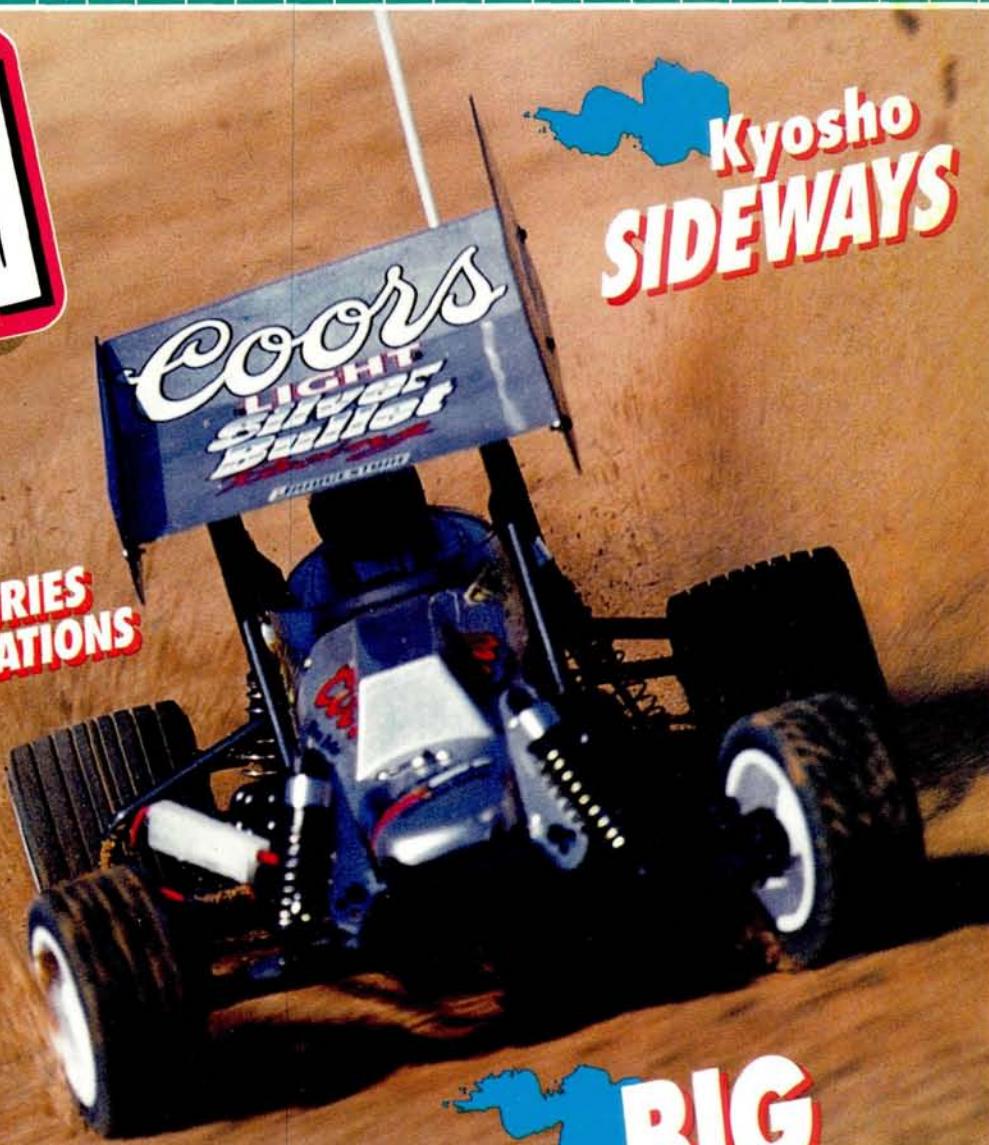
Radio Control CAR ACTION

THE WORLD'S PREMIER R/C CAR MAGAZINE

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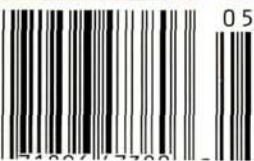
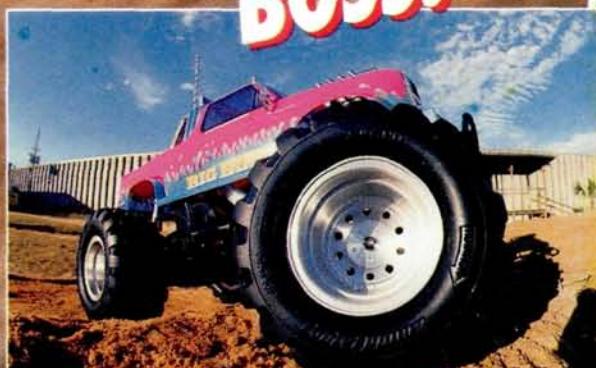
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- ACCESSORIES
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DRAG...
WINTERNATS

MONSTER
TRUCK RACING

BIG
BOSS!





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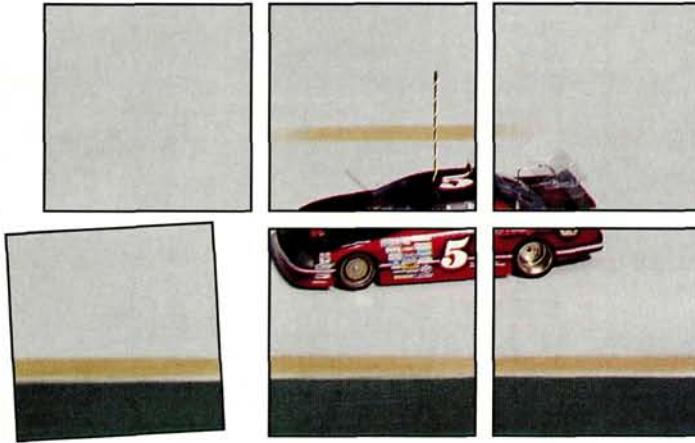
IEDA WINTERNATIONALS, page 76



ON THE COVER: Center: Kyosho's new Sideways sprinter kicks up clay. Top right: Schumacher's Pro Cat—new and improved. Bottom: The Kyosho Big Boss's big wheel! (Photos by Steve Pond.)

EDITORIAL

by RICH HEMSTREET



THIS IS OUR THIRD annual "Top Ten" issue, and it's better than ever. You, our readers, are always asking which car is better, and each year, we attempt to answer that question by naming our Top Ten Cars. For 1990, there was a tie in one category, so our Top Ten Cars are found in only nine categories. Check it out and see how many of your favorite cars we chose.

We've also named our Top Ten Drivers for '90, based on the drivers' performances in the '89 racing season. Most of the names should be familiar to regular readers, as these are the guys who get the job done when the A-Main takes the green flag.

Our other Top Ten categories include Accessories, Photos, Pit Tips and—new for this year—the Top Ten Readers' Illustrations.

Also this month you'll find Track Reports on four new cars. Smitty Pond reports on Schumacher's new Pro Cat 4WD off-road terror and Bolink's Gold Edition Eliminator 10. Bill Henning wrings out the Kyosho Sideways on the dirt oval and Joe Bruni put Kyosho's Big Boss through its paces.

Rick Houle caught all the action at the International Electric Drag Association (IEDA) Winternationals drag race in Colton, CA. This was the first major event sanctioned by the IEDA, and it looks as if R/C drag racing at last has the organizational direction it has needed. Rick also sent us the conclusion of his Monster Truck racing report, which looks at the future.

Summer is around the corner, and R/C racing is heating up all across the country. Reports of new tracks come in almost weekly, the majority of them being oval tracks. The Ranch Pit Shop (in Pomona, CA) has removed its famous 1/8-scale gas roadcourse and replaced it with a combination flat oval and a roadcourse primarily designed for 1/10-scale on-road cars.

We're still putting together a list of races that we'll be covering this summer; I'll let you know where we'll be as soon as we decide. In the meantime, continue to send in information about the events your clubs are planning. You never can tell; it might be an event we can work into our plans.

Next month, we'll feature our 1990 Car of the Year. I won't tell you which one it is, but by carefully checking out this issue you should be able to figure it out. See you next time! ■

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LETTERS

WHERE TO WRITE TO US

If you're writing to us (and we'd love to hear from you), please be sure to address your letters to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Only subscription orders and inquiries are handled by our Customer Service Department in Mount Morris, IL; other mail addressed there must be forwarded to us in Connecticut, and this leads to long delays.

TRIPLETT RESULTS

"Glitz and ad space are more important than race results." That quote is from *Car Action's* Senior Editor, Rich Hemstreet. Sure, I like to read how Bud Bartos, Ralph Burch and Kent Clausen did at Whippoorwill, but the 81 people who placed in the lower amateur mains would like to read their names, too.

Who subscribes and buys your "glitz and ad space"? Burch, Doseck, Rott and Clausen? No! Amateur racers nationwide—99.9 percent! I'm sure you could give up some ad space and a couple of

pictures of blurry cars to return a little of the support we give you each month. I hope you have the courage to print this and ask for readers' input, if you think I'm wrong. Thanks.

BRUCE TRIPLETT
Augusta, GA

Bruce, I'm not sure where you found that quote, but it wasn't in my response to your earlier letter. We do all we can to inform amateur racers (and non-racers) of ways to enjoy the hobby more.

I doubt that 99.9 percent of our readers are interested in how you finished, but in case they are, here goes:

- *TRC/Trinity Challenge at Lake Whippoorwill: Bruce Triplett finished 8th in the M-Main Stock Class.*

- *ROAR Oval Nationals at the Peachbowl: Bruce Triplett finished 5th in the C-Main Stock Class.*

- *Car Action Weekend at Lake Whippoorwill: Bruce Triplett finished 9th in the E-Main Stock Class and 5th in the D-Main Modified Class.*

*If these results aren't accurate, Bruce, don't write to me. I've told you that the amount of work it takes to double-check lower main finishes isn't worth it. If you can find a magazine containing more information than *Car Action* dishes out every month, let me know, because I want to subscribe to it! Until then, happy racing!*

RH

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MaxTrax specializes in R/C trucks, and trucks alone. To get the most performance from yours, take it to the Max—Hobbico MaxTrax.



DON'T CHAIN ME DOWN

In your *Monster Truck* special edition (page 52), you showed a Clod Buster pulling truck with chains on its tires. That's outrageous! I've never seen a *full-scale* pulling truck with tire chains. As far as I know, that would never be allowed. I think R/C pulling should be as close to full-scale as possible. Our association doesn't allow tire chains. The trick to pulling is to get power to the ground by moving the weight on the vehicle. I'd enjoy hearing your opinion.

PHILIP E. GRENIER

President, Central States Radio Control Pulling Association

Philip, your letter is a little outrageous. As far as I know, foam and spiked tires

aren't allowed on full-scale pullers, either! When was the last time you saw a full-scale puller use batteries and electric motors on carpet?!

I think you missed the point of the article. It wasn't about a competition-legal puller. In fact, the author states, "While this project may not be the definitive word in sled pulling, the combination of accessories gave this truck devastating pulling power." I think some of you guys and gals need to lighten up!

WD

GREETINGS FROM THE SULTAN

I'm a new subscriber and a recent entrant into the world of R/C trucks. My first purchase was a Big Brute, followed by a Clod Buster and a High Roller. I just or-

dered a RACO 1/4-scale Supermodified Roadrunner.

I'm in the Sinai, Egypt, as one of the Multinational Force and Observers (the result of the Camp David Accords establishing peace between Egypt and Israel). While we can't participate in worldwide R/C events (owing to our unique international peace-keeping duties), here at El Gorah, there's an active R/C following: American, British, Canadian, Norwegian, Italian, Uruguayan, Dutch, French, Columbian, New Zealand and Fijian! (That's an 11-nation military force dedicated to peace in the Middle East!)

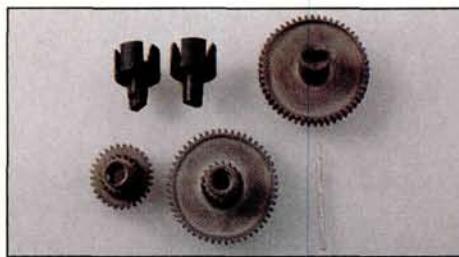
While we in the MFO are financially capable of maintaining our enthusiasm for the hobby, we're concerned about our

(Continued on page 10)



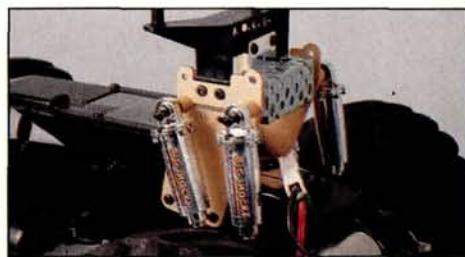
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LETTERS

(Continued from page 9)

younger counterparts, who, in their letters to you, express their problems sustaining their interest in R/C—mainly because of folks who enter competitions with a full stable of vehicles that were built to win, regardless of cost! Kit manufacturers must get involved. Profit is based on demand, and satisfied teenagers go on to become satisfied adults who are still in the R/C hobby.

This is a message from the Sultan of El Gorah: *Car Action*, keep up the good work! We walk our prisoners through the land mines of the Sinai Desert.

WALTER D. BOUVE
HNSI-MFO-Sinai

It's great to hear from the people who keep peace around the world. I think you're right about how to keep kids involved in R/C. Not everyone races competitively, and that's why new products for novices are needed. By the way, watch where you're walking!

WD

ALL THE WRONG REASONS

I have several complaints about your coverage of the World Championship Truck Pulls (March '90). Your writer did a lousy job and an injustice to all the truck owners there. He didn't even bother to mention the names of the Concours winners, and the pictures were black and white! You can pick up a newspaper and see that! Everyone worked very hard to get their trucks ready, and it takes a lot of time, skill, effort and money to create such beauties. To add further insult, a few pages later, you had full-color coverage of cars, some of which weren't even winners! That stinks!

Since October, I've been getting a truck club started in our area, and I've told everyone to join the NR/CTPA and to buy your magazine. Ha! I won't be telling them that anymore; we didn't get the coverage we deserved for this event.

Your article sure dampened our spirits! We were going to build a puller, but why should we, when we can build a car and

get the recognition we deserve?! (This is not only true of your magazine, but most of the others as well.) If you continue this prejudice, the hobby will lose a lot of truckers and be the worse for it.

On to my next complaint: your writer called the obstacle course "boring"! I bet the guy who smashed up his monster truck with the blue Vette body and Barbie-doll driver didn't find it boring. I drove, and I sure didn't find it boring. The course may not have had head-to-head competition, but it was a race against the clock that took speed as well as skill. The writer did us all wrong and probably didn't do the NR/CTPA much good either, because with this type of coverage, I doubt that the turnout will be as good at their next event.

Why should we try to generate enthusiasm for this hobby if we can't get the recognition we deserve? How can you expect people to get interested with coverage like this? I think you should print an apology to all the truckers who were there. I'm enclosing a list of the Concours winners. Unfortunately, I don't have pictures of their beautiful trucks: I thought that was your representative's job, but I guess I was wrong.

SUZIE AUGUSTYN
Gary, Indiana

Suzie, I'm the guy who did you wrong in my coverage of the World Champ Truck Pulls!

I want to address several points in my reply:

1. Omitting mention of the Concours winners was an unfortunate oversight; the wonderful jobs they did should have been recognized. (At the end, I'll list the winners.) I wonder, however, how upset you'd be if you weren't one of them?!

2. Because the event took place in a college gymnasium, color photos weren't really possible, because indoor color doesn't usually reproduce well. I wanted to get the winners outside for some shots, but they weren't announced until the awards ceremony on Sunday evening. At that point, it was too dark outside, and most of the trucks had been packed up.

FULL SPEED AHEAD

3. I assume that the color photos you refer to were from the R/C Car Action Weekend at Lake Whippoorwill. We take photos of any vehicle we think will be of interest to our readers. Just because the judges don't award it a trophy doesn't mean we can't print a picture of it!

4. What exactly do you deserve? According to our Reader Survey, only 12 percent of you (from a sample of 2,500) are interested in truck pulling. Our coverage of this aspect of the R/C hobby far exceeds that of all the other magazines combined, and I think it has been more than fair: we've covered three pulls; we have the "Truck Stop" column in alternate issues; and last month, we printed an article on the basics of pulling. No other publication can match that!

5. The obstacle course was boring! For anyone with driving skills (other than the ability to go straight), there was no challenge. Dave Sproul, NR/CTPA's president, wants to have head-to-head competition in the future, so he obviously thought the competition could have been more exciting!

6. The tone of your letter really troubles me. I think you're in this hobby for the wrong reasons. I got into R/C cars to enjoy myself! I had no idea it would turn into a career. You should be doing this because you enjoy pulling, truck racing and creating a beautiful truck. If the sole reason you invest time, effort and money is to get exposure in a national magazine, you may want to think about getting out of the hobby!

Here's the list I promised:

Most Realistic Puller—John Beecher, Pro Puller with Koalaty Design tractor body.

Most Realistic Monster Truck—Stephen Carmine, Scratch-built

Concours Pullers

1. Mark McFadden, Pro Puller with Koalaty Design tractor body.

2. Tom Aument, Pro Puller with Koalaty Design tractor body.

3. Mark McFadden, Clod Buster

(Continued on page 22)



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W

READERS' RIDES

Welcome to Readers' Rides. This is our way of giving recognition to the unique, innovative—and sometimes bizarre—vehicles that our readers have created. If you want to join the growing ranks of Readers' Rides winners, send us a sharp, uncluttered, well-exposed color photo (no Polaroids, please!) of your car or truck, along with a brief description. Who knows? The Ayatollah of Radio Controlla might pick your car.

If your ride is chosen, you'll receive a one-year subscription to Car Action, or we'll extend your existing one. You'll also be eligible for the second annual "Readers' Ride Car of the Year Contest" in the fall of 1990. Send your photos to Readers' Rides, R/C Car Action Magazine, 251 Danbury Rd., Wilton, CT 06897. Be sure to include your address and phone number, in case we need to contact you!

ONE HOT ROD!

This incredible street rod is the work of Jay Heiser of Bel Air, MD. Its chassis is an Advanced Custom Street Machine, topped by a '34 sedan body—Jay's first attempt at airbrushing, and a fine beginning! With gold pinstriping, a candy-blue body and other small details (e.g., the rear-view mirror and hood scoop), this rod is ready to take on any concours competitors!



FRONT WHEEL FROM FLORIDA

Sisters can be useful—this photo was taken by one! Here's a Kyosho Maxxum FF made by Russell McMullan of Miami, FL. He tricked it out with a Tekin 300 ESC, a Futaba Magnum Jr. and a Kyosho speed SCE battery. Russ plans to try on-road racing with it. Ask your sister to take another photo when you get some slicks and a full body on it!

DENNY-FOOT

J.J. Denny of Colby, KS, sent us this good photograph of his nicely finished Blackfoot. This is no stock Blackfoot! J.J. tricked it out with a Novak ESC, a Trinity Monster Mash motor, a Thorp ball diff and an Airtronics radio. A well-deserved subscription goes to J.J. for this neat 'Foot!



MOTORCRAFT MOTORCADE

This Motorcraft combo comes to us from Steve Spencer of Batavia, OH. His mostly stock Blackfoot is pulling an aluminum-and-wood custom trailer, on top of which sits a Bolink Eliminator 10 Graphite with a matching body. The combo has a Twister modified motor, a Tekin 600 PTX, a Tekin mini receiver and TRC tires and rims. This is a really great way to show up at a race. Now all Steve needs are some little guys to help back the car off the trailer!

DEALING IN QUARTERS

Bill Stahl of Greenville, TN, says that these 1/4-scale WCM stock cars are "where R/C racing is at for me."

Bill is a dealer for WCM, RACO and Auto Engineering, and he'd like to thank Petty Enterprises for the help they gave him with the paint. The scale detail on both cars is outstanding! No wonder Bill says he's proud of them—he should be!



START FIRING!

"After reading your November Track Report on the Dominator, I had to have one of those dirt missiles!!" That's Larry Dentise's first comment in the letter he wrote to us. From Marietta, GA, he sent us this picture of a Dominator that's equipped with a Novak T-1X ESC, a Twister 13 triple-modified motor and a Magnum Jr. radio. Larry is so impressed with it that he has given his JR-X2 to his son! (What a dad!)

HYPER IN HOLLAND

Twenty-one-year old Rob Adelaar of Beverwijk, the Netherlands, sent us this picture of his Corvette-covered Hyper 10. This is Rob's third car and it's from the U.S. It has a PK speed controller, a Trinity Pure Gold motor, a Futaba radio and a Bolink body that's embellished with Parma decals. Way to go, Rob! A subscription is flying over to you as a reward for your efforts.

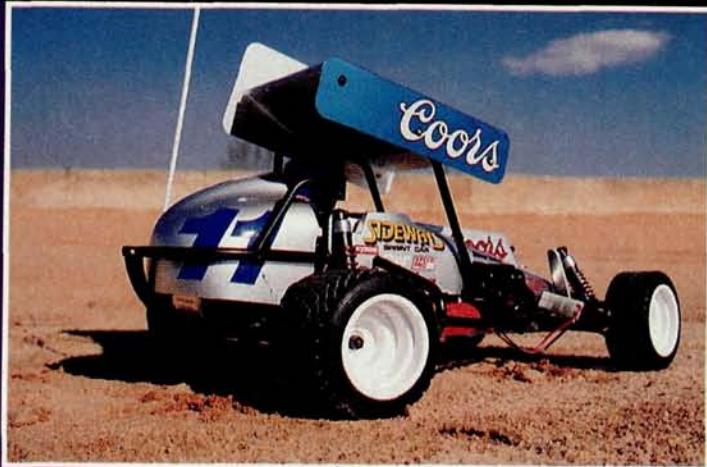


BUDGET BODY

This interesting Blackfoot is the product of Bob Blanchette of Cheshire, MA. Bob really likes this body, and so do we. It's made of a plastic soda bottle that's "aerodynamically clean and—best of all—it only cost 10 cents." Now that's budget racing!

TRACK REPORT

ORIENT OVAL *EXPRESS!*



by BILL HENNING

IF I SAY sprint-car racing is the most popular form of full-scale dirt-oval racing, few will disagree. The strength of organizations like World of Outlaws (WOO) and United Sprint Association (USA), and the familiarity of names like Steve Kinser and Sammy Swindle leave little

room for debate. Despite this, I've never tried R/C sprint-car racing, and it was time to fill that void. After checking out the options at my favorite hobby shop, I discovered a new sprint car from Kyosho*—the Sideways.

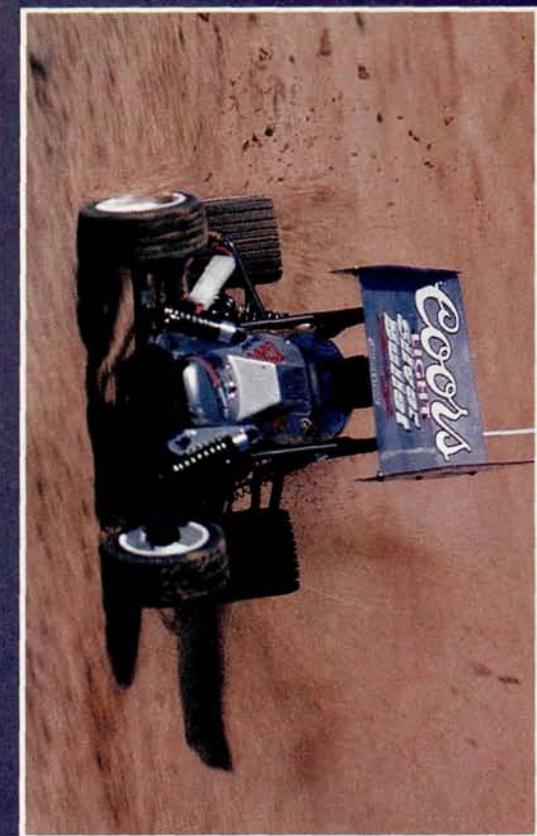
THE KIT

The Sideways is based on Kyosho's Ultima, and it uses some Ultima parts, e.g., the suspension components on all four corners; the aluminum-truss-channel chassis; and the gearbox. All this, plus a sprint-car body, a plastic roll cage, nerf bars and photos of the Sideways are packed in a colorful box. For maximum traction, the hefty rear treaded tires are $2\frac{1}{2}$ inches wide, while the front treaded tires are smaller. They're mounted on sharp-looking, center-line-style rims.

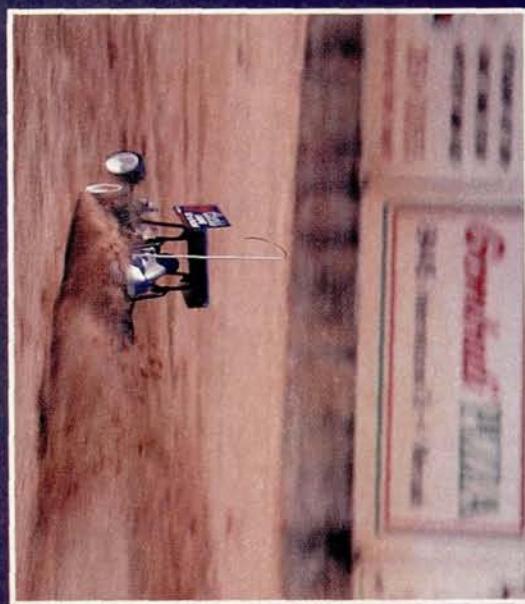
ASSEMBLY

Before I started, I read the entire instruction booklet, which was filled with useful information. The shock assembly was first. The Sideways uses the same black, plastic, oil-filled shocks as the Kyosho gas-powered Corvette ZR-1 and Rampage 10. The shocks go together quickly and work smoothly, but their two spring-tension settings don't allow you to fine-tune your chassis at the track. An adjustable spring clamp would solve that problem.

The gearbox has a gear-type differential and metal bushings—a big improvement on plastic bushings. Before I started the rear suspension, I dyed the roll bars, the nerf bars and the rear bumper black. These parts are molded in white plastic, and I didn't like their toy-like appearance. After attaching the rear shock tower and the gearbox to the chassis, I installed the rear suspension arms, the dogbones, the axles and the rear shocks.



SIDeways



KYOSHO

SIDEWAYS

Type Sprint car
Scale 1/10
Sug. Retail Price \$219.95

DIMENSIONS:

Overall Length 16 inches
Width 11 inches
Height 10 inches
Wheelbase 10.25 inches
Front Track 8.5 inches
Rear Track 8.75 inches

WEIGHT:

Gross (w/bat.) 4 pounds, 4 ounces

BODY:

Type Sprint car
Material Polycarbonate

CHASSIS:

Type Truss channel frame
Material Aluminum

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear drive
Differential Bevel gear
Bushings Metal bushings

SUSPENSION:

Type (f/r) Lower A-arm/
upper control link
Dampening (f/r) Plastic, oil-filled,
coil-over shocks

WHEELS:

Front: Type One-piece plastic
Dimensions (DxW) 2.125x1.34
inches
Rear: Type One-piece plastic
Dimensions (DxW) 2.25x2.5
inches

TIRES:

Front/Rear Low-profile w/tread

ELECTRICS:

Motor LeMans 05 stock
Battery 6-cell stick pack*
Speed Controller Mechanical rotary

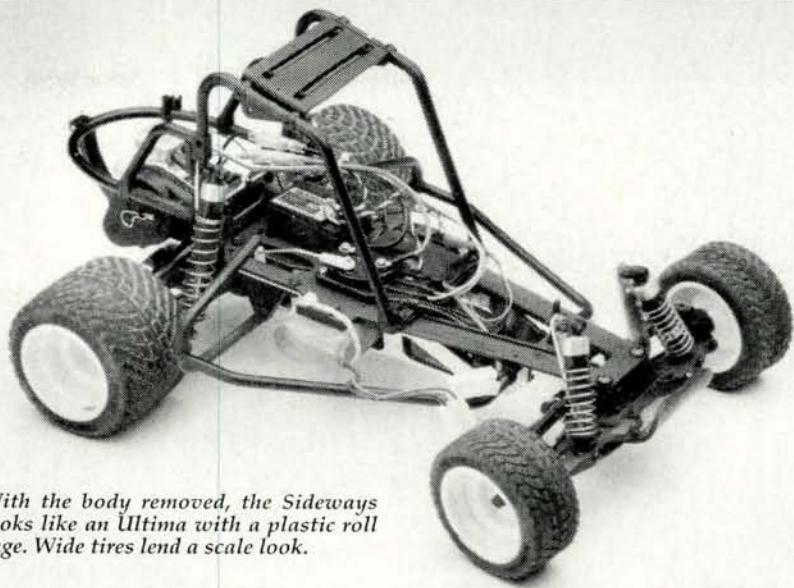
OPTIONS AS TESTED:

Acoms Technisport pistol-grip radio; Reedy
1200mAh SCR pack.

COMMENTS:

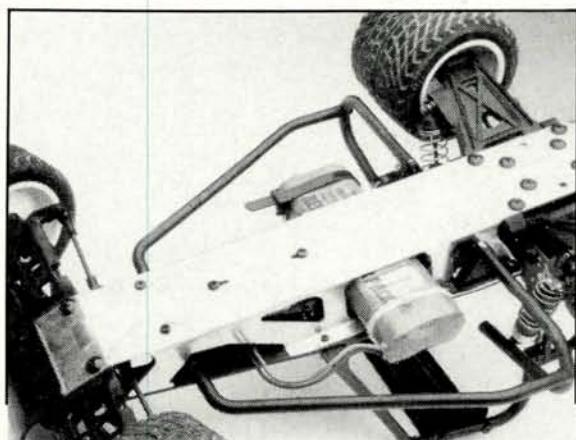
The Sideways was a pleasure to build. It's basically an Ultima, so after-market parts are very easy to come by. Bronze bushings in the drive train are a big improvement, but they would have been nice for the front wheels, too. Ball bearings and a ball diff would make the Sideways a real performer!

* not included



With the body removed, the Sideways looks like an Ultima with a plastic roll cage. Wide tires lend a scale look.

The front-suspension assembly was next. I attached the shock tower, the lower A-arms, and the steering knuckles to the front bulkhead, which I then secured to the chassis with four screws. I installed the front shocks and assembled and positioned the servo-saver and the steering linkage. The next steps involved the radio and speed-control installations. I chose an Acoms Technisport* pistol-grip radio, which has BEC (battery



The familiar aluminum-truss channel frame can take a 6-cell battery pack.

eliminator circuitry), servo trims, servo reversing, steering- and throttle-rate adjusters—all the important features that most R/C cars need.

The Technisport has a changeable handle grip for left-handed operation—an important feature that several manufacturers overlook. I did have one problem: when I attempted to connect the speed-control rod from the servo arm to the speed control, I found that it was too short. Luckily, I had a rod of the right length in my parts box. Once that had been straightened out and the receiver and resistors had been mounted, I installed the nerf bars, the radio plate, the

roll cage, the counter gear, the motor and the pinion gear. Then I mounted the scale-like sprint-car tires and prepared the body.

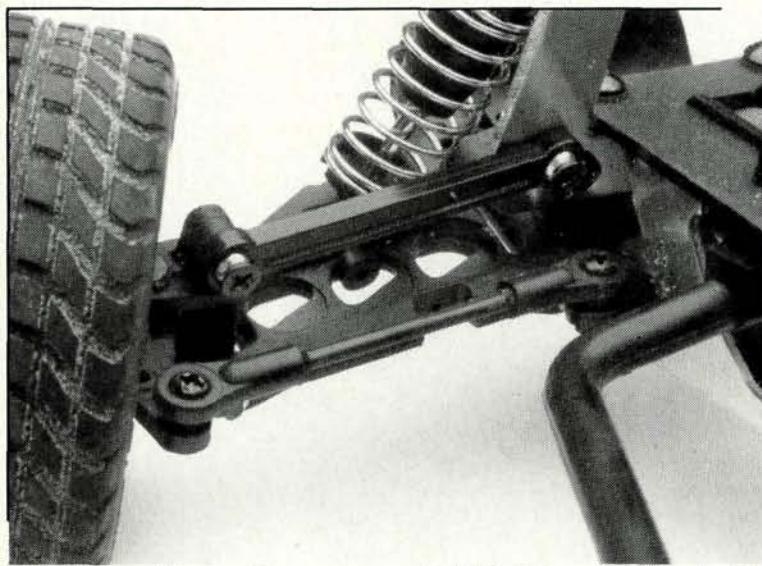
The decals that came with the Sideways didn't look very authentic. For a

true sprint-car look, I based my paint scheme on some photos of Steve Kinser's car. Steve was the '89 United Sprint Association's champ. Some Pactra* Indy silver and metallic-blue spray paint, along with some Autographics* Silver Bullet and Marui* Coors decals

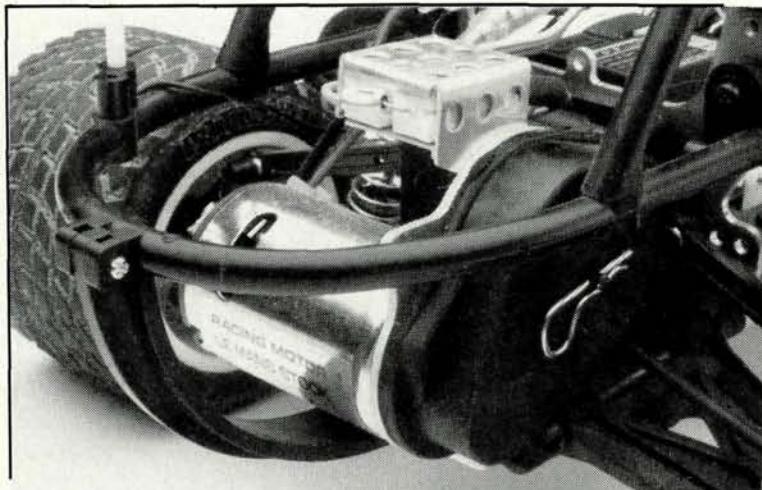
captured the look I wanted. The driver is molded into the polycarbonate body and a helmet is screwed onto the neck. This, along with the headers and adjustable top wing added to the car's realism.

Unfortunately, the top wing was difficult to adjust. Two small screws under the wing mount had to be removed, and these were difficult to reach. A pin-and-body-clip type of mount would allow easy trackside adjustments.

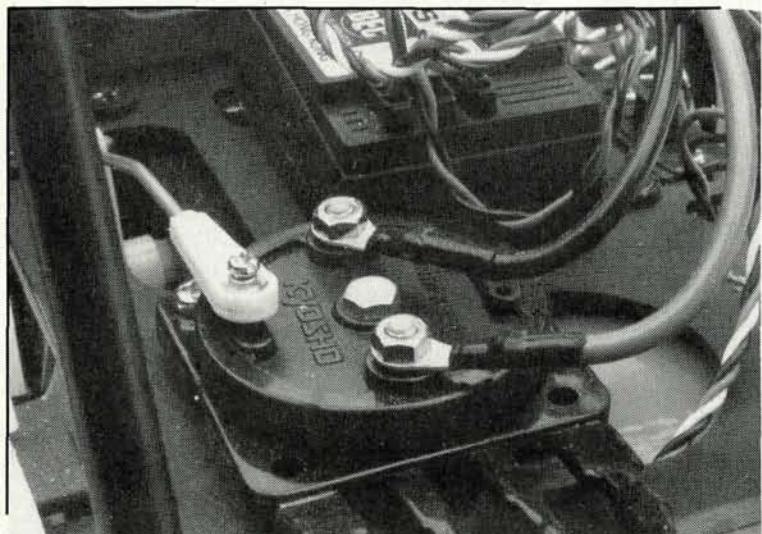
I didn't like the way that the completed Sideways sat high off the ground; it looked more like an off-road car than an oval car. The suspension can be lowered by putting a piece of 1/4-inch-long



The Sideways' front end has an upper control link that can be replaced with an adjustable link to change camber.



The rear roll cage protects the LeMans 05 stock motor from damage. A modified motor would really make the Sideways move!



Kyosho's rotary speed controller is one of the smoothest mechanical speed controllers on the market.

KYOSHO SIDEWAYS

silicone tubing in each shock, but for this test, I tried it in stock form first.

PERFORMANCE

The dirt track was too muddy, so the first test took place on an asphalt parking lot. Once my SCR battery pack had been charged, it was time to rip up some blacktop.

I checked my throttle and steering trim first, then I set the car down and squeezed the trigger. I was a little disappointed with the car's lack of speed as it took off, but if you replace the kit's 15-tooth pinion gear with a 17- or 18-tooth gear, there should be a big improvement. Even though there are metal bushings throughout the gearbox and rear hub carriers, the front wheels have plastic bushings that don't spin freely. In fact, one wheel only spins for a few seconds after you spin it, and this slows the car. The best solution is to replace all the bushings with ball bearings.

On asphalt, the Sideways has too much suspension travel, and this tends to pick up the rear inside tire when the car rounds a sharp turn. A front stabilizer bar will help cure this. The rubber silicone tubing in the shocks also helps on asphalt because it limits the suspension travel and allows tighter cornering.

The second test site—a short, hard-clay dirt oval that should have been just right for the Sideways' treaded tires—eventually dried out enough to run off a couple of battery charges. (On a loose surface, a knobby tire would probably be required.) The results on the dirt were pretty much the same as on the asphalt, but I added a little spring tension to the right front shock.

Kyosho's Sideways sprint car was a pleasure to build, and since it's basically an Ultima, there are many available after-market parts. Ball bearings, a ball diff and pinion gears will transform it into a top-notch performer, and you'll move straight ahead with the Sideways.

**Here are the addresses of the manufacturers featured in this article:*

Kyosho; distributed by Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Acoms; distributed by MRC/Tamiya, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.

Pactra/Plasti-Kote, 1000 Lake Rd., Medina, OH 44256.

Autographics of California, 7401 White Ln., #1, Bakersfield, CA 93309.

Marui; distributed by Phoenix Model Co., 53 Trade Zone Court, Ronkonkoma, NY 11779.

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Raider Std	89
Raider ARR	99
Big Brute Truck	99
Big Boss Truck	119
Double Dare 4WD Truck	159
Blackfoot Truck	109
Clod Buster 4WD Truck	259
RC10L Fiberglass	109
RC10L Graphite	149
RC12L Fiberglass	69
RC12L Graphite	129
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Delta P-12 3 shock	129

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7.2 Volt SCE	20
Astro Flight 114	10
Protech 702	15
Protech 701	25
Protech 707	40
Protech 700	55
Protech 706	65

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LETTERS

(Continued from page 11)

Concours Monster Trucks

1. Doug Peterson, Clod Buster
2. Suzanne Augustyn, Clod Buster
3. Jerri Moss, Clod Buster

WD

SCOOP-A-SAURUS

In regard to your "Inside Scoop" (March '90), the Saurus racer was unveiled a few years ago at the Tokyo Auto Show. Made by Nissan, this car was intended to be a back-to-basics, nostalgic 2+2 roadster (a concept now enjoyed by many in the form of the Mazda Miata). When it was first shown, it was perceived as rather odd, but certainly not ugly, as you seem to suggest.

The car isn't available in the United States or Japan, but it's used as a "club racer." As for the Saurus Cup, it isn't for R/C cars; it's a series of on-road races that test the drivers' skills, and it's run by full-size cars (which are all alike except for color and number). The Saurus Cup is much like the successful IROC series here in the U.S.

It seems to me that the car is built by Kyosho, because, aside from the obvious Japanese background, the 1.9 rims are borrowed from the ZR-1 gas car. Your magazine is awesome!

CHRIS PAUKERT
University Heights, OH

Chris, thanks for the information! I'm surprised by how well-versed you are on the Japanese auto scene. You're correct about the model being produced by Kyosho, but remember what they say—beauty is in the eye of the beholder. That's why Wally "World" David and I disagree so often about his cars' paint jobs!

RH

SPEEDY STOCK

I'm writing to tell you about my son Mark, who's six years old. He's been racing for three years and is already a veteran R/Cer: he recently won a 1st-

place trophy in Heavy Metal Stock Class for points, and he has about 20 trophies to his credit!



Seven months out of the year, Mark races with the CT RC Off-Roaders R/C Club in Fairfield, CT. He can't wait for spring, so that he can start again. He owns a stock Lunch Box van with Teenage Mutant Ninja Turtles painted on it. (We tried to get him to race a Monster Beetle, but he didn't like it.) Because his hands are so small, he uses a stick controller with a camera strap to hold it up. (We tried to get him to use a pistol-grip controller, but he didn't like that, either.) The old standard seems to work, because he received 1st in his class!

He'd be very happy if you'd print this letter along with the picture of him with his 1st-place points trophy.

HOWARD JACKSON
E. Norwalk, CT

Howard, it looks as if Mark is off to a great start in R/C racing! Maybe he'll be one of our top 10 drivers in a few years.

These youngsters can really drive! I remember when I got into R/C racing: a 10-year-old with his arm in a cast beat me soundly, even after one of his car's front wheels fell off! Maybe we could start a seniors' division; we'll keep its

THIRD ANNUAL



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GEAR RATIO CONFUSION

I'm confused about gear ratios. I realize that you can run higher gear ratios on shorter tracks, but it's confusing when someone tells me they're running a 4:00:1 gear ratio, and I don't get the same results when I try it. I think the problem is that a 4:00:1 gear ratio can be made up in different ways, e.g., 24 pinion and 96 spur, 25 pinion and 100 spur, 26 pinion and 104 spur, or 27 pinion and 108 spur. All these ratios are with 64-pitch gears. How do I determine which I should use for short straightaways and tight turns? Please help!

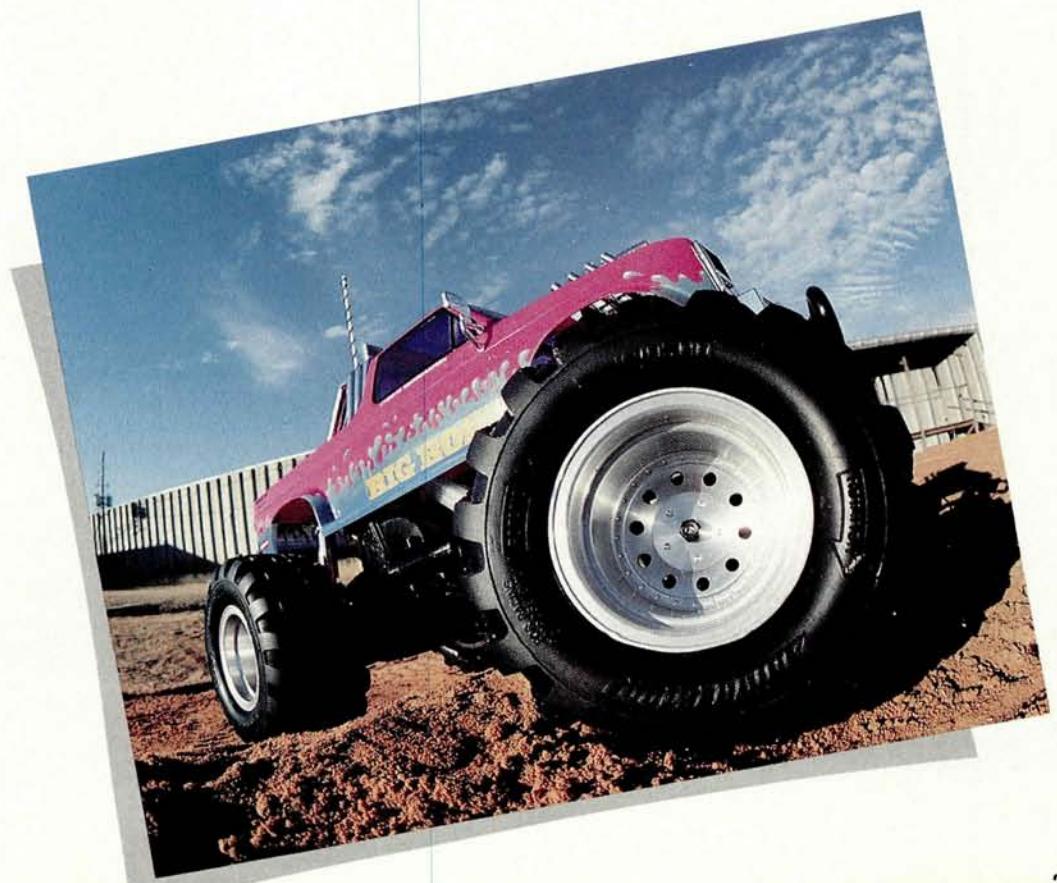
TED CHESAR
Mayfield, PA

Ted, there's really no mystery to gears. In general, you should try to use the largest combination of gears that gets you the ratio you want. Larger gears are smoother and more efficient because they have less rolling resistance.

It's nearly impossible to use someone else's gear ratio and have your car perform identically. Several factors are key to your choice of gear, including the motor (number of turns and condition of the brushes, etc.), the tire size, the speed controller and the car's weight. Even driving style makes a difference! Use other racers' gear ratios only as a ballpark starting point. WD

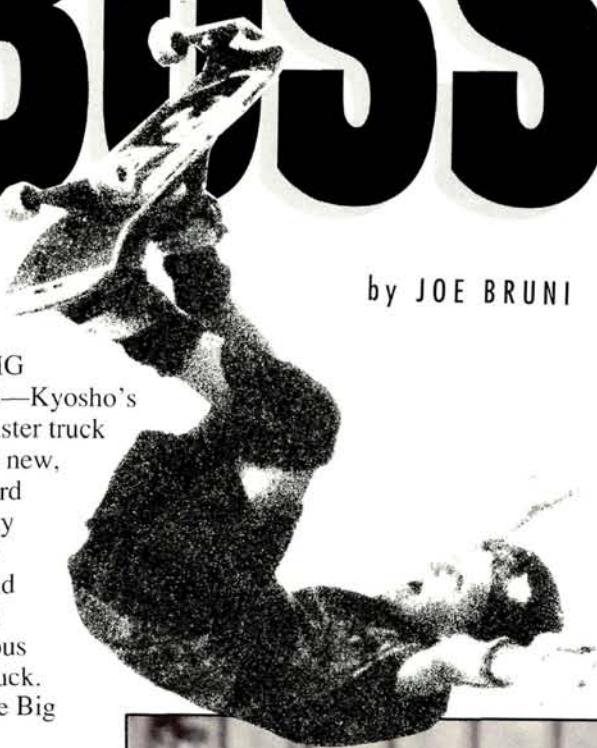
We welcome your comments and suggestions. Letters should be addressed to "Letters," *Radio Control Car Action*, 251 Danbury Road, Wilton, CT 06897. Letters may be edited for clarity and brevity. We regret that, owing to the tremendous numbers of letters we receive, we cannot respond to every one.

W A T C H O U T * # ! !



K Y O S H O

BIG BOSS

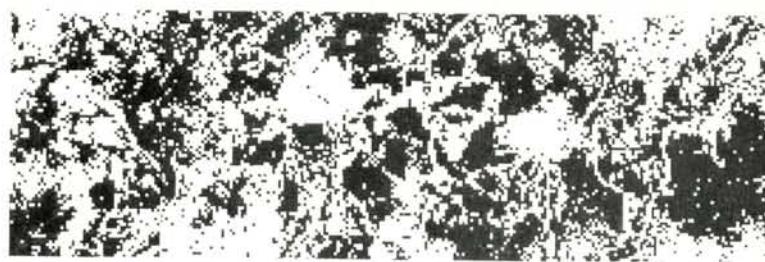


by JOE BRUNI

THE BIG BOSS—Kyosho's latest monster truck kit—has a new, rugged Ford F-250 body with more chrome and detail than any previous Kyosho truck. To take the Big Boss one step beyond other monster kits, there's a full set of oil-less bronze bushings, and these make nylon bushings a thing of the past for Kyosho trucks.

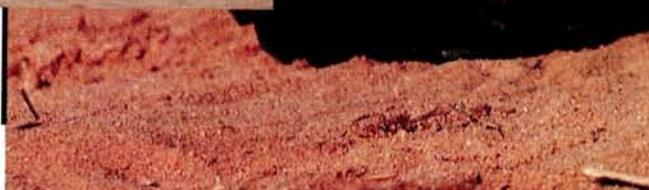
WHAT'S INSIDE

Like all Kyosho products, the Big Boss comes in a sturdy box with its contents neatly arranged, either in numbered plastic bags or on lettered, injection-molded parts trees. The cover displays an awesome array of color photographs showing the highly detailed, finished model, as well as some impressive action shots. In addition to the new body

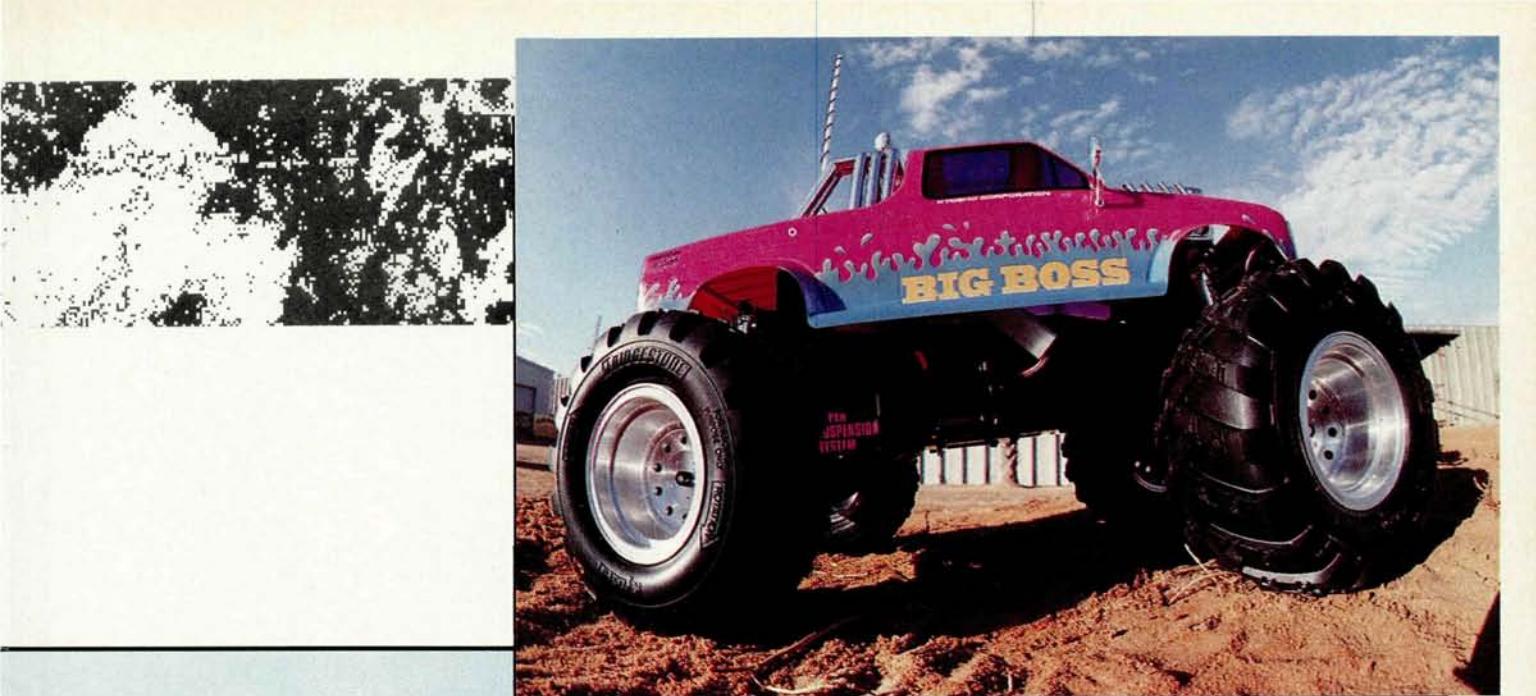


SOME HEADS ARE GONNA

R O L L !



(Continued on page 31)



PHOTOS BY STEVE POND

KYOSHO

BIG BOSS

Type Monster truck
Scale 1/10
Sug. Retail Price \$179.95

DIMENSIONS:

Overall Length 18.5 inches
Width 12 inches
Height 10.54 inches
Wheelbase 11 inches
Track (f/r) 9.5 inches

WEIGHT:

Gross (w/bat.) 5.8 pounds

BODY:

Type Ford F-250
Material Polycarbonate

CHASSIS:

Type One-piece tub
Material ABS plastic

DRIVE TRAIN:

Primary Pinion/spur
Transmission Gear drive
Differential Planetary gear
Bushings Bronze bushings

SUSPENSION:

Type (f/r) Double wishbone
Dampening (f/r) Plastic, internal-coil
shocks

WHEELS:

Type (f/r) One-piece chromed plastic
Dimensions (DxW) (f/r) 2.75x2.5
inches

TIRES:

Front/Rear Rubber terra tires

ELECTRICS:

Motor Stock LeMans 05
Battery 6- or 7-cell flat pack*
Speed Controller Rotary mechanical

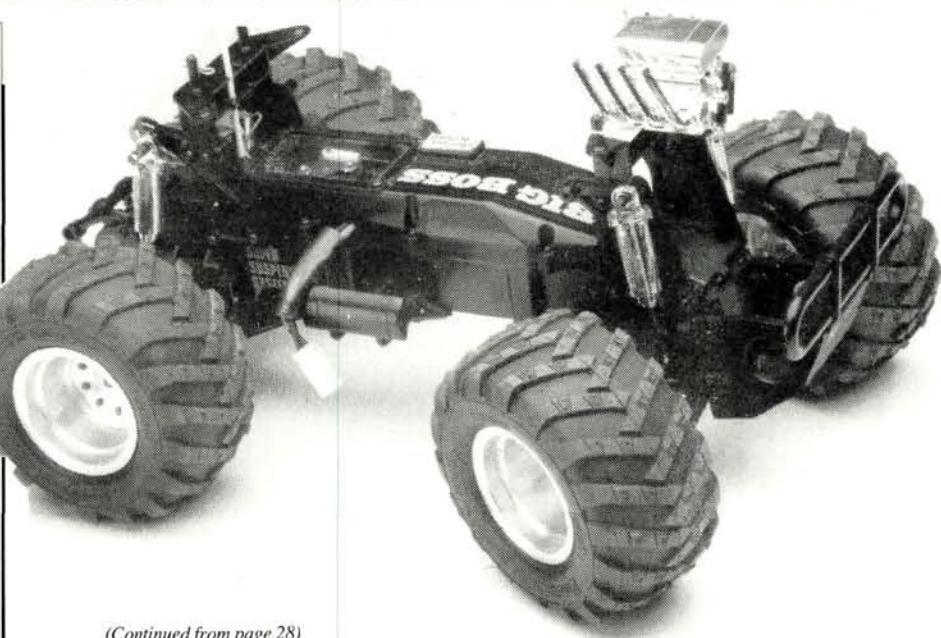
OPTIONS AS TESTED:

Kyosho Pulsar 2000 pistol-grip radio system, LeMans 240WS motor, Speed 6-cell race pack; Sees aluminum wheels.

COMMENTS:

The Big Boss is extremely agile and quick, and compared with the previous Kyosho monster trucks, its suspension is much improved. No matter how high the jump, the internal-coil shocks don't bottom-out. It does tip slightly when over-cooked in the corners. The bronze bushings are a great improvement on the nylon ones used in the past.

* not included



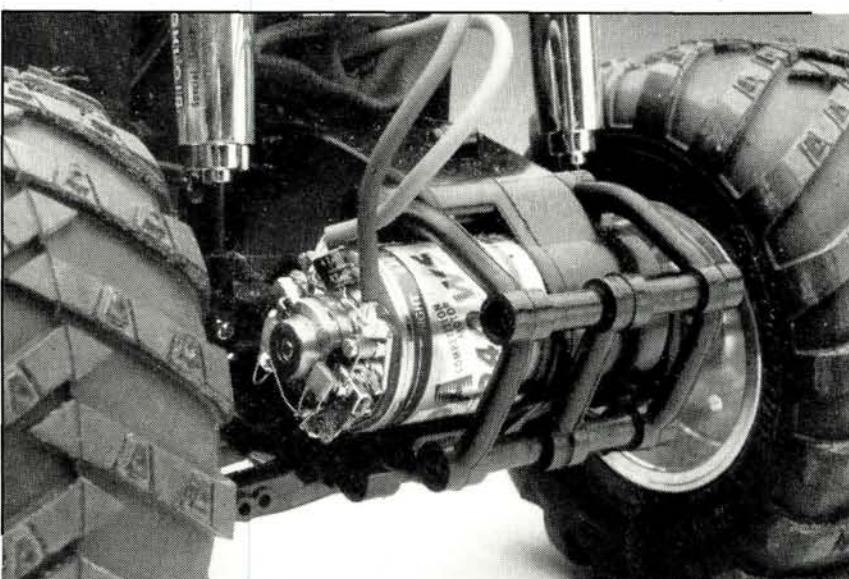
(Continued from page 28)

and the bronze bushings, the Big Boss kit includes a long list of high-tech features. The Kyosho assembly manual is the gold standard of the industry; it includes a table of contents, a parts list, a list of tools and highly detailed assembly illustrations. Kyosho even gives advice on maintenance and hop-up potential.

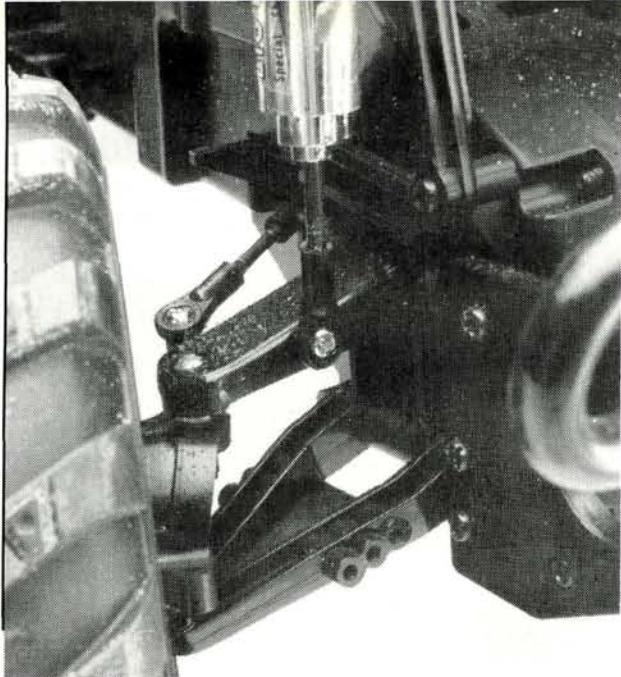
Probably the most striking features of the Big Boss are the huge, soft-rubber, Bridgestone monster tires that measure 5.75 inches. A high-torque, Kyosho LeMans stock 05 motor and a rotary speed controller get you ready for some heavy-duty mud-slinging. To protect your investment, the Big Boss has extremely durable front and rear bumpers that were designed to absorb a great deal of shock (or curb, or rock!), a sealed gearbox and a radio-component box that can be kept virtually free of the "three Ds": dirt, dust and debris. The much-improved shocks have better dampening and a chrome finish.

GOIN' TOGETHER

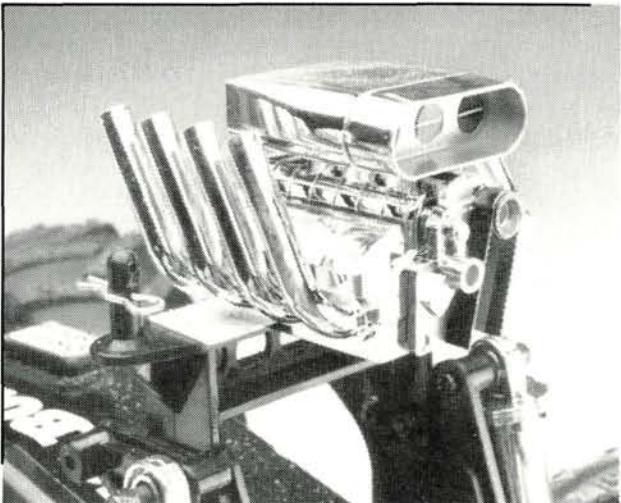
After reading the instructions, assembly begins with the most tedious, but crucial, part: the rear gearbox. As already mentioned, Kyosho includes a



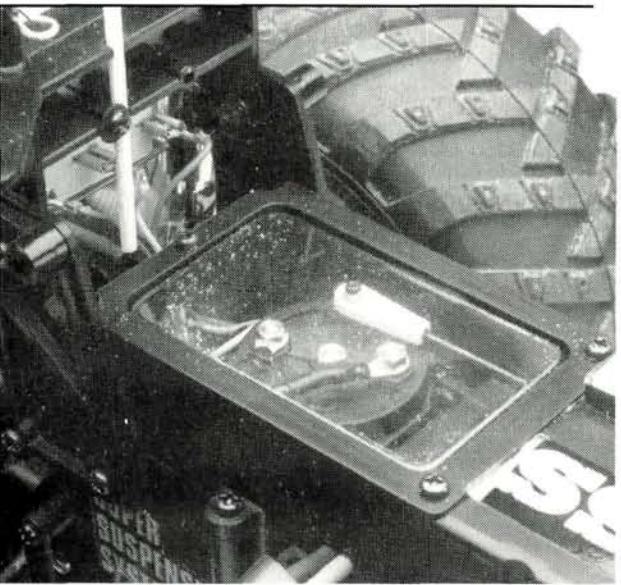
To give the Big Boss a little more kick, the LeMans SPA 240WS motor was used in place of the stock motor.



With the exception of one new-style shock, the suspension on the Big Boss resembles those of Kyosho's previous monsters.



To go with the all-American Ford body, the Big Boss also includes a blown, fuel-injected V-8 engine. (No, it doesn't run!)



Sitting under the clear inspection shield is the heavy-duty Kyosho rotary speed controller that's now standard on Kyosho trucks.



replacement set of bronze bushings with the Big Boss. Simply replace every nylon bushing indicated in the assembly manual with a comparable bronze bushing. Use extra care when installing the bushings; they're made of a soft metal, so any excessive force could dent or scratch the inner surface, and this could hamper performance. I used the rubber-handle end of my needle-nose pliers to push the bushings into place. Even though the bushings are said to be "oil-less," they still require lubrication. I suggest that you use a generous supply of grease throughout the gearbox. When you eventually join the

Big Boss—an excellent choice if you want a truck with fine detail and dependable performance...

halves of the gearbox, spin the universal joints; if they're difficult to turn, take apart the halves and make sure that all the gears and shafts are properly aligned. Assembly of the suspension system and the tub chassis is straightforward, and I have nothing to add to the instructions. The radio installation came next, and I used the Kyosho Pulsar 2000 (a 2-channel, pistol-grip radio system), but virtually any 2-channel system will fit the Big Boss. Before you put the system into the truck, the manual suggests that you perform a 2-minute bench test to make sure that all the servo settings are in the neutral position. If you check the system at this time, you won't have to disassemble the truck later because it's misaligned or you can't fine-tune your radio settings.

Although it isn't mentioned in the manual, I recommend that you use a good-quality lubricant where the tie rods come in contact with the pivot balls and the shock shaft. This minor detail will make a noticeable improvement to suspension and steering performance. I used Dan's* Banana Lube which has a good, thick consistency and provides a slick, smooth range of motion—as well as a great smell!

The battery-holder assembly is very easy to do, and Kyosho's simple design enables you to make a 15-second trackside battery change. Just pop off the hook pin, slide out the battery, slide in a new battery, replace the pin—and you're off!

The Big Boss comes with the LeMans 05 stock motor. If you're new to monster-trucking, this is an excellent motor to help you master the various steps of off-road racing, but as you become better at flinging mud and crushing cars, you'll want to upgrade to a faster motor. I



used the LeMans 05 motor for the break-in period, but I wanted a little more pizazz, so I replaced it with a hotter Kyosho 240WS wet-magnet motor. The power punch is delivered to the motor by means of the dependable Kyosho rotary speed controller, which is mounted just below a clear, polycarbonate, tub-cover window.

DETAILS, DETAILS

Kyosho did its homework when it came to detail. As well as the beautiful Ford F-250 body, the kit includes an enormous number of chromed parts, and the most impressive detail is the beefy, super-charged motor. With its heavily chromed front and rear bumpers, a tri-tubular roll bar, side mirrors and replica halogen spotlights, the Big Boss is ready to capture the concours award at any major monster-truck event!

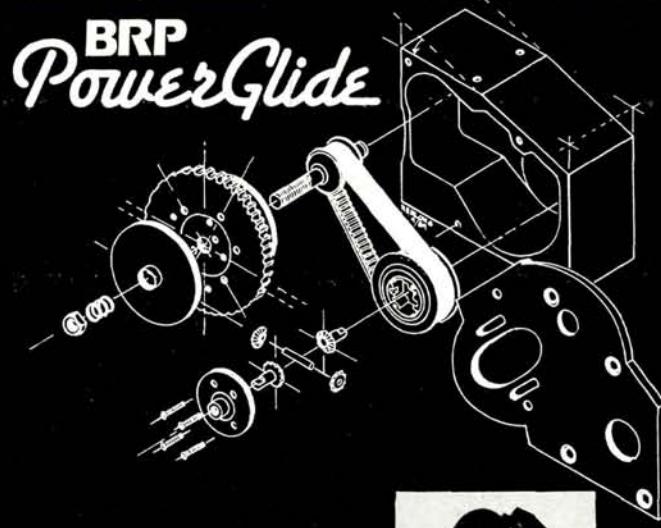
Because the Ford F-250 body comes clear, you can be creative when painting your Big Boss. Who could be better than Eric Goldschrafe* to do a "tune" on my Boss? With a deadline rapidly approaching and a wet and wild Florida beach scene in mind, Von Erich went to work. Twenty-four hours later, he asked me to pick up the finished product. I was very pleased with the fusion of magenta and a blue-green wave pattern.

Even though the stock chromed rims are well-constructed and finely detailed, I felt such a "trick" paint job deserved nothing but the best, so I replaced the factory wheel set with a set of Sees* one-piece aluminum mag wheels. Each wheel is intricately machined to a fine, high-luster, well-balanced wheel. Be sure to mount all the tires so that they rotate forward (there's an arrow marked on each tire). To avoid slippage during those high-torque encounters, glue each tire to its rim. Before mounting the wheels to the wheel shafts, I put a small drop of CA on each shaft-pin hole while centering the pin through the designated hole in each shaft. This ensures that the shaft pin won't fall out at high speeds.

Finally, it was time to see who was Boss...

(Continued on page 103)

BRP PowerGlide



5000 RC-10 Trans
5001 Ultima Trans
\$129.95

Ball Slipper Clutches



Fits:

- MIP Trans
- Optima Mid
- JRX2
- Top Cat

\$34.95

Features:

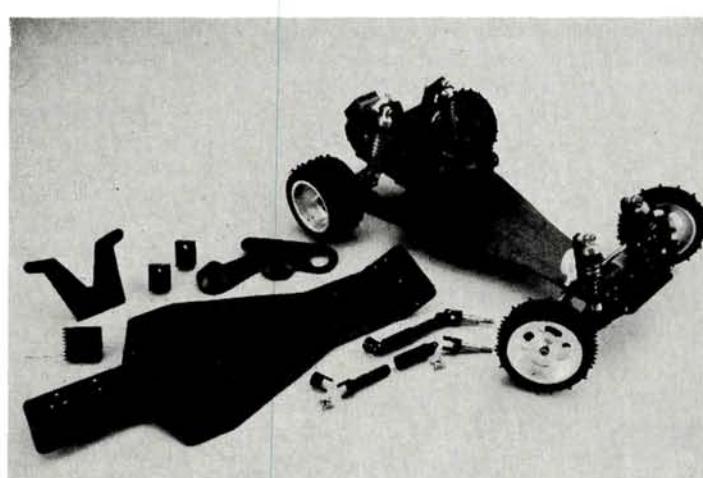
- Telescoping Drive Shafts
- Universal Joints
- Stainless Steel Axles
- For Stock & Modified
- Fits: RC-10, Ultima & Optima Mid
- Super Strong

\$56.95

Telescoping Drive Shafts



Bullet's PowerGlide Tranny has become the most awesome of all trannies available today, and when combined with the Comp-10 conversion kit—well—Industry standards are spelled BULLET.



BRP 1110 Project: Competition Kit RC-10 Kit Includes: • RC-10 Competition Graphite Chassis • Graphite Shock Towers • Graphite Trailing Arms (with adjustable castor and camber) • Telescoping Dog Bones • Stainless Steel Axles • Universal Out Drive Adapters • Motor Heat Sink

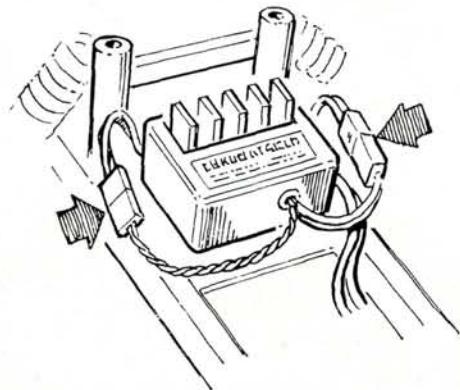
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Racing Products



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PIT TIPS

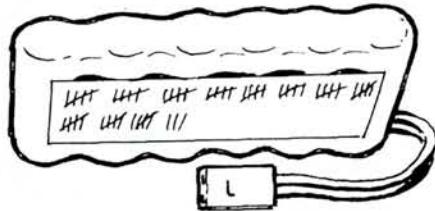
by JIM NEWMAN



QUICK-CHANGE SPEED CONTROLLER

Some owners don't have enough electronic speed controllers for all their cars. This one solved the problem by cutting his controller's leads, inserting the appropriate plugs and sockets, and mounting the controller with Velcro. Now, he can quickly move his speed controllers from one car to another (likewise, his receivers).

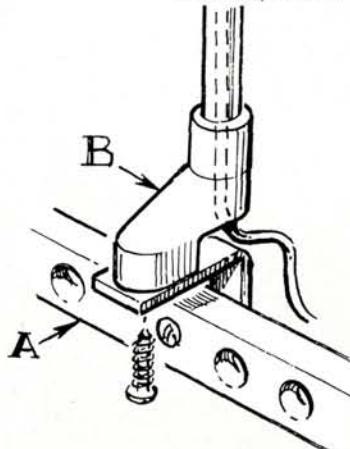
Nicky Nilprata, Yakima, WA



CHARGING RECORD

Stick a strip of white artists' tape along the side of each Ni-Cd pack, and write the complete history of the pack on it: the number of charge/discharge cycles, the capacity when new and the capacity following subsequent tests. This record will quickly reveal any deterioration in performance, and sub-standard packs can be kept just for practice.

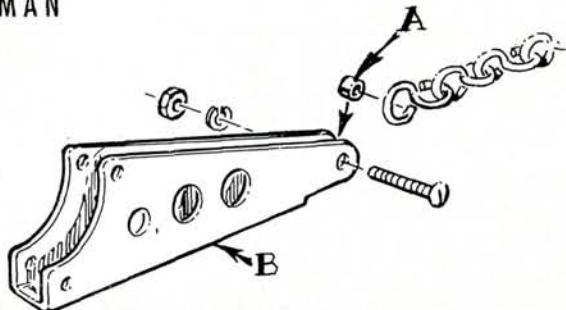
Karlo Eisele, Frankfurt-Maine, W. Germany



IMPROVED BLACKFOOT ANTENNA MOUNT

Do you want to eliminate the need to re-thread the antenna wire each time you remove the body shell? Attach a $1/2 \times 1$ -inch aluminum (or, better yet, steel) bracket to the body-mount cross brace, and then attach a chassis antenna-mounting bracket as shown. Enlarge the hole in the body to make it fit over the new bracket.

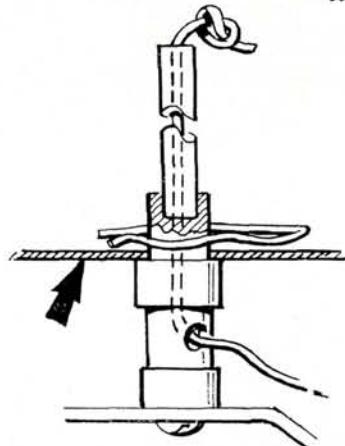
Andrew Hotema, Aien, HI



SLED-PULLING CHAIN MOUNT

This chain mount was made with a *Midnight Pumpkin* wheelie bar and a suspension-unit spacer (A). The spacer goes through a chain link, then both are placed between the side plates of the wheelie bar (B), where they're secured with a machine screw, a lock-washer and a nut. The bar can be mounted in the usual position on the drive case.

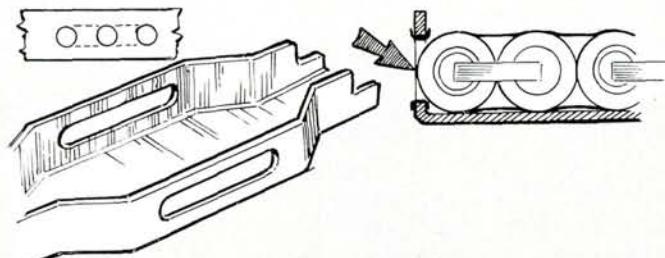
Jeff Frank, Howell, NJ



HOLE-SAVER ANTENNA MOUNT

This works with Parma's universal body mounts (it might work with others, too), and it's a way in which you can avoid having an additional hole through the body for the antenna. Simply drill a hole in the side of the mounting post, then plug the antenna tube into the hole in the top of the post, where it will fit perfectly. Now thread the antenna wire into the side hole and push it up through the tube, securing it at the top with a rubber band. (Arrow indicates the body.)

Brett Sterne, N. Hollywood, CA



RC10 NI-CD PACK

After making a simple modification, you can fit a 6-cell, side-by-side Ni-Cd pack into your RC10. Carefully "slot" the sides, as shown: drill 1/2-inch-diameter holes along the sides of the chassis, then use a Dremel cut-off disc to cut between these holes. *Caution: wear safety goggles while doing this!* To protect the cut edges from cracking, carefully smooth and round-off the edges, and cover them with vinyl tape. Don't make the slots any larger than necessary, and center them over the widest part of the Ni-Cd pack, as shown by the arrow.

Joel Mahoney, Whitehall, MI

(Continued on page 38)

PIT TIPS

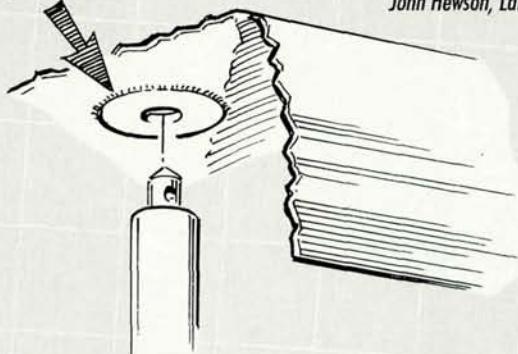
(Continued from page 34)



EASY PAINT MIXING

To mix paint efficiently, drop three or four clean ball bearings into your paint jar then shake the jar vigorously for 1 or 2 minutes.

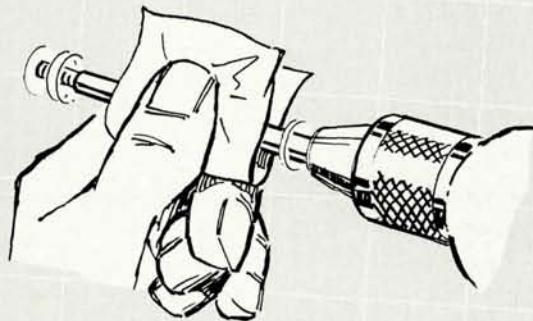
John Hewson, Lafayette, IN



BODY-MOUNT REINFORCEMENT

Cut washers the size of quarters from scraps of polycarbonate body shell, then glue them under the shell to reinforce the holes. Use only glue that's approved for use on polycarbonate; others might dissolve the plastic. If in doubt, use silicone sealant as a glue.

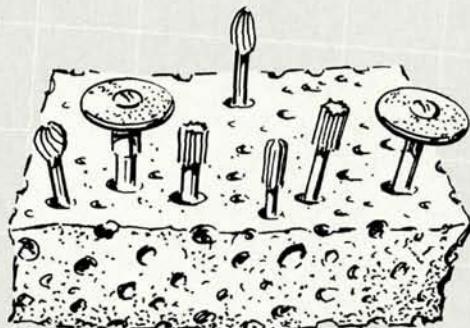
Gregor Jeffrey, Gloucester, Ontario, Canada



SHOCK-SHAFT POLISHING

When you're rebuilding your shock absorbers, examine the shafts for nicks and scratches, which cause leaks. Putting the shafts in a drill and polishing them with a soft cloth saturated with very fine auto polish will remove most signs of abrasion.

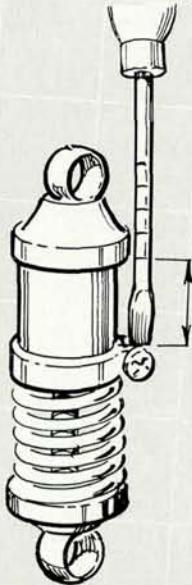
Robert Jordan, University, MS



SPONGE DREMEL-TOOL CADDY

Stick all your Dremel cutters into the holes in a car-wash sponge. They'll be firmly held yet can be selected easily.

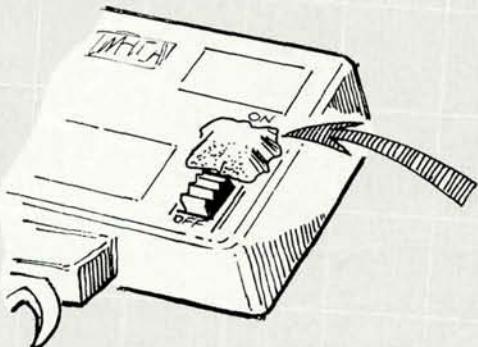
Ray Juschkus, New Hyde Park, NY



EASY SHOCK BALANCING

Jason uses one screwdriver to push down on the spring clamp and another to tighten the screw. Notice how the first screwdriver has calibration marks scratched or filed into the shaft; this makes it easy to gauge the amount of spring pre-load on each shock.

Jason Tavener, Golden Square, Victoria, Australia

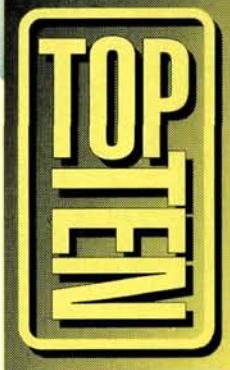


CONTROLLER-SWITCH LOCK

Having arrived at the track with flat controller batteries because the switch had been accidentally knocked to the *on* position, Jeff wanted to prevent this from happening again. He bought some Blue Tack from a stationery store and put a large lump of it above the switch to hold it in the *off* position. Blue Tack can be removed very easily and leaves no residue.

Jeff Rosenblad, Princeton, NJ

Radio Control Car Action will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Pit Tips." Send rough sketch to Jim Newman, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.



We've done it again! We've selected the top ten cars, accessories, drivers, "Pit Tips," photos and reader illustrations.

Of course, we're bound to say how difficult it was to choose all these, and that we agonized over our choices for months—losing sleep, going without food—the whole shabang! We don't mind suffering for our readers, but we do have our reasons for such self-sacrifice.

■ First, we like to recognize the outstanding: the great should be praised—don't you agree?

■ Second, we just know you'll love turning the pages to see if your favorite is ours, too; and then, if it isn't, you'll enjoy sending us "informative" letters to abuse us and put us on the right track!

We know we can't please everyone, but we've tried to be as fair as possible, and we hope you'll enjoy reading about our choices. Here they are—our Top Ten for the start of a new decade.

For the third straight year, the editors of *Car Action* have voted on the Top Ten Cars. Voting isn't always easy, because we try to consider many factors, including racing success (at both national and local levels) and how the cars performed in our "Track Reports."

This year, our Top Ten Cars fall into only nine categories: the 1/10-scale on-road category provided a two-car tie. The two repeaters from last year are the Tamiya Clod Buster, which remains the king of the 4WD Truck category (for the third year in a row), and the Team Losi JR-X2.

So here we go with *Car Action's* Top Ten Cars for 1990.

Fuel-Powered

KYOSHO RAMPAGE

Kyosho's "flagship"—the Rampage—is a 1/10-scale, off-road racer, and it's our choice as the top fuel-powered vehicle. It has a fairly straightforward layout with an aluminum-plate chassis on which the fully enclosed differential is mounted. The engine is mounted amidships and turns a counter gear that's attached to the drive shaft. The Rampage's suspension is based on that of the Ultima (Kyosho's 1/10-scale electric off-roader): it has lower A-arms, upper control links and oil-filled,



coil-over shock absorbers. An O.S. .12 CZ-R engine provides plenty of power—almost too much for the car, in fact! The car is very exciting to drive if you have a lead finger!

Those who prefer electric cars will find the Rampage appealing because it doesn't need all the starting gear associated with other

gas cars. A T-handled recoil starter makes life extremely easy, so the Rampage's simple operation lures reluctant electric racers into the realm of gas.

Its winning performance, solid features and ease of operation make the Kyosho Rampage our choice for the top fuel-powered car.



Entry-Level Off-Road

TRAXXAS SLEDGEHAMMER

The Traxxas Sledgehammer is available in both Ready-to-Run and kit versions, and that's why we chose it as the top entry-level off-road vehicle for

1990. Because it's such a strong performer, there was no need for both categories!

In the Ready-to-Run version, it comes complete with a radio, an electronic speed control and a clear body that's cut out and mounted. Just paint the body, charge a battery and go! The kit version doesn't include a radio system, but it's quite easy to assemble.

The great thing about the Sledgehammer is its dual purpose—it's a racing truck and a monster truck! Its many components show its off-road racing intentions:

KINGS OF THE



4WD Truck

TAMIYA CLOD BUSTER

It's the *premier* 4WD truck! For the third year, the Clod Buster is at the top; no truck is as big, as strong, as all-conquering, or as popular.

This winner of our "Clash of the Titans" is a 4WD, 4WS, dual-motor monster with independent suspension; two shocks on each corner; huge 6 1/4-inch terra tires; and a detailed plastic body with chrome bumpers and a roll bar.

The great thing about the Clod is that it doesn't require any special radio to achieve 4WS, although a strong steering servo is highly recommended!

Pulling and car-crushing are where the Clod excels, and there's an economy/power switch to conserve energy for just cruising around, or to really lay the power down for brute strength. Top speed isn't the Clod's strong point, but speed isn't what you'd buy it for. When this beast gets going, little can stand in its way!

lower A-arm/upper control-link suspension; oil-filled, coil-over shocks; telescopic universal drive shafts; and a tub-type chassis made of tough nylon, ABS plastic and T-6 aluminum. Then there are its monster-truck features: MT wheels and spiked tires; eight shocks (two on each corner); and super ground clearance.

When we considered all the Sledgehammer's features—for both racing and car-crushing—and its stout track performance, our choice for the entry-level off-road vehicle was easy!

4WD Off-Road

YOKOMO YZ-10

This year's top 4WD off-road car is the Yokomo YZ-10. In the hands of Masami Hirosaka, it won the IFMAR Off-Road World Championships, and what

maintain. A single drive-gear assembly is at the core of the YZ-10's efficient drive train. Belts running from the drive-gear assembly to the front and rear ball diffs ensure smooth operation, and plenty of suspension travel (front and rear) lets the YZ-10 tackle the roughest tracks. It comes with all the



else is there to say? Well, Cliff Lett won the ROAR Off-Road Nationals with it; seven of the top 10 cars at the Nats were YZ-10s; and five of the top 10 at the Worlds were YZ-10s! Those are pretty good numbers.

It's popular with average racers because of its simple, efficient design, and it's probably the easiest 4WD car to assemble and

features needed in a top off-roader: graphite chassis and shock towers, ball bearings, aero-dish wheels with spiked tires, and a sleek body with a belly pan.

Also in the YZ-10's favor is the fact that it's distributed by Associated, so parts will be easy to find, if you need them. It really isn't difficult to see why it made our Top Ten!

TOP TEN CARS



2WD Truck

TAMIYA KING CAB

This is the third consecutive year in which Tamiya has swept both truck categories. The Blackfoot was the 2WD winner until Tamiya unveiled its new weapon—the King

1/10-Scale On-Road (Tie)

ASSOCIATED RC10L

In the hands of Kent Clausen, the RC10L is the fastest closed-course R/C car around. Kent set the new record at the RC Thunderdrome in 1989—a staggering 70mph! The car has won major races everywhere, and it's now one of

the most widely raced 1/10-scale pan cars.

At home on road courses and ovals, the RC10L is an enlarged version of Associated's RC12L, and it features a front end of two nylon suspension arms with a graphite plate for stability. The rear uses a T-bar that's mounted to the chassis with twin rocker-balls, and the pod is offset so that the motor is toward the center of the car.

Its success right off the



table is what makes the RC10L so popular; with few, if any, adjustments, it runs consistently well on any track. Parts availability is another plus; most hobby shops are sure to stock any-

thing you might need for it. Ease of assembly and adjustment coupled with a winning performance and good price make the RC10L one of our two top 1/10-scale, on-road cars.



There are many available 1/10-scale, on-road cars, but it's often difficult to tell them apart, and half of them use the same generic components. The Hyper 10 is unique.

You'll immediately no-

tice that there are no gears on the right side of the motor pod. As a matter of fact, there are no gears! The Hyper 10 uses the Hyperdrive belt-drive system, which has motor and axle pulleys in place of the standard pinion/

1/10-Scale On-Road (Tie)

HYPERRIVE RACING HYPER 10

spur-gear setup. No car is quieter! Because of the Hyperdrive system, the Hyper 10's motor is mounted on the left side of the motor pod.

The unique front end has the steering servo mounted on the crossbar—a simple change that eliminates bump-steer when caster

changes are made, because the servo rotates with the axle as you adjust caster.

Although the Hyper 10 is slightly heavier than most other 1/10-scale, on-road cars, its super-smooth suspension is adequate compensation. Combined with four rocker-balls and a narrow rear track, the tri-shock arrangement makes a highly adjustable and effective rear suspension.

One-of-a-kind features and excellent handling are our reasons for choosing the Hyper 10 as one of our two top 1/10-scale on-road cars.

Cab—and this newcomer is proving to be a force to be reckoned with, too!

The King Cab is a departure from past Tamiya trucks, which were primarily meant for fun. The King Cab has competition aspirations, too, and for this, it has features like a deep, injection-molded, tub chassis that

protects the radio gear; 4W independent suspension with lower A-arms and adjustable upper links; oil-filled, coil-over shocks; and a front anti-roll bar.

Probably the most interesting feature is the differential. For the first time in a Tamiya truck, there's a ball diff. Like the diffs found in

many high-performance vehicles, this one is very smooth, and it's connected to two steel drive cups that turn steel dogbones and axles. Like the other "new breed" Tamiya cars, the King Cab has ball bearings for the tranny and bronze bushings for the wheels—no plastic bushings! The poly-

carbonate Nissan King Cab body has every conceivable detail molded-in.

Reports are coming in from all over about King Cab victories, and these victories aren't just at the expense of kit trucks. The King Cab is beating some conversions, too! Hey! We're in the presence of royalty!

1/12-Scale On-Road

ASSOCIATED RC12L

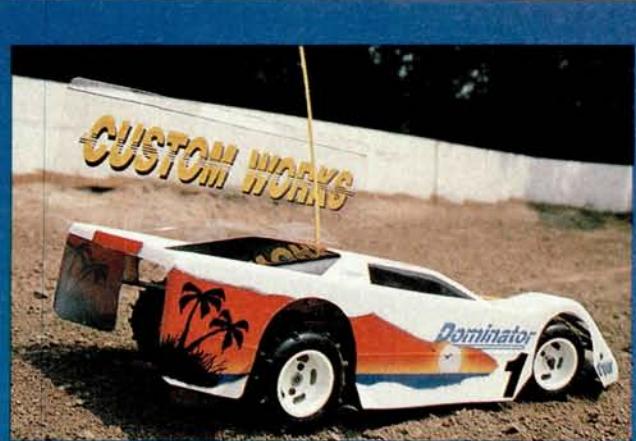
When 1/12-scale cars are discussed, one car usually dominates the conversation: the Associated RC12L! At the '88/'89 IFMAR World Championships, the RC12L dominated, with Masami Hirotsuka leading the Associated parade. To that, add Kent Clausen's ROAR Paved Oval and On-Road National Championships, and it's easy to see why there are so many RC12Ls around!

When choosing a car—especially one of the more delicate 1/12-scalers—the availability of parts is important. Parts for the RC12L are in abundant supply, so

that's no problem. At almost any track where 1/12-scale cars are being raced, you'll find an overabundance of RC12Ls!

The 12L started as the 12E and, through numerous chassis and suspension mutations, it became the 12i, and now, the 12L. The RC12L was the basis for the RC10L, but now the process has been reversed: larger, nylon suspension arms with three mounting holes were developed for the 10L, and these were eventually retrofitted to the 12L!

With good parts availability, continued product development, ease of operation, and regional, national, and world racing victories, expect the RC12L to be a threat again next year.



Dirt-Oval

CUSTOM WORKS DOMINATOR

The Custom Works Dominator is our top dirt-oval car for 1990. This car swept all 10 spots in the Stock A-Main and nine of the top 10 spots in the Modified A-Main at the 1989 ROAR Dirt Oval Nationals.

The Dominator is a true competition car, and it's aimed at very experienced racers. The heart of the Dominator is its ultra-efficient chain-drive system, which has a short chain that runs from the rear drive sprocket to the reduction shaft, and a longer chain from the reduction shaft to the front drive sprocket. Ball bearings at

every point create a drive train that's nearly drag-free; spin a wheel, and all four seem to go forever.

Another key feature is the way the weight is distributed in the car: the battery is mounted on the left side—perfect for oval racing. The mid-ship motor position, coupled with the offset battery location, make the Dominator a perfectly balanced machine.

Unlike many competition cars, the Dominator truly is a complete car: it has a set of white nylon wheels, spiked tires, rock-solid front bumper/body mount, a rear body mount, foam body pads and a sharp-looking wedge body to complete the package.

This year (the first year in which we've chosen a top dirt-oval car) the Dominator was our only choice.

(Continued on page 47)

2WD Off-Road

TEAM LOSI JR-X2

During the two years in which it has been around, the JR-X2 has been our top 2WD off-road car. With Jack Johnson at the controls, the JR-X2 won the ROAR 2WD Modified Off-Road Nationals and the NORRCA 2WD Stock and Modified Off-Road Nationals. With other wins at big races, the JR-X2 is showing up in massive numbers at local tracks around the country.

Two major features are responsible for the JR-X2's success: its low-rotating-mass (LRM) transmission and its five-link trailing-arm



suspension. The LRM tranny features 48-pitch gears made of a strong, lubricant-impregnated plastic that provides smooth operation. The center-mounted ball differential is adjusted from the outside, so everything is kept clean. Telescopic rear drive shafts combine with the transmission to give the JR-X2 one of the smoothest drive systems found in any

off-road car.

The JR-X2's five-link suspension makes it very stable over rough tracks, so it's at home anywhere.

Although it's top dog now, Team Losi hasn't rested on its laurels! It recently introduced the Performance Kit, which has all the newest updates used by the team drivers: a stretched chassis; a long front shock tower and

long front shocks; a pro rear shock tower with plenty of adjustment holes; a long pro body; H-arms and anti-squat blocks; 1/16 and 3/32 hard balls; and a Jr.'s Choice modified motor.

With improvements to competing 2WD off-rovers, it will be interesting to see if the JR-X2 can become our second, three-time winner!

TOP TEN CARS

CAR ACTION BEGINNER PAK™

Here's a great package deal that will dial you in to the wild world of R/C cars!

THE CAR ACTION YEARBOOK recaps the year's best articles from our monthly issues. It features articles on airbrushing, off-road tires, detailing, stock cars, a 4WD shootout, RC10 tech, the dirt-oval Optima and much more—plus many hot modeling tips.

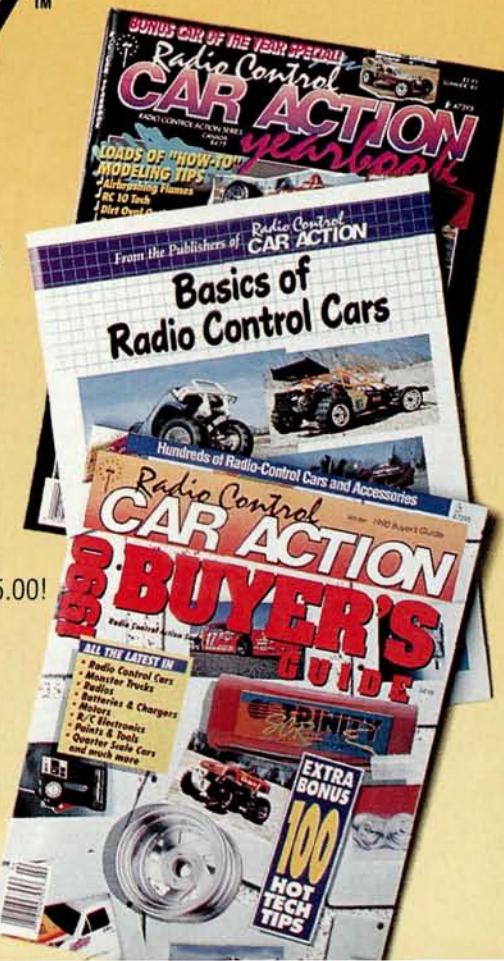
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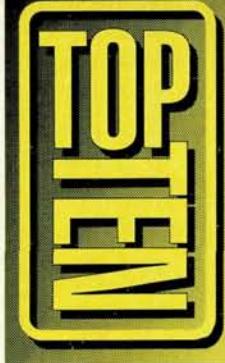
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DRIVERS

ONCE AGAIN, IT'S TIME TO ANNOUNCE our selections for the Top Ten Drivers awards. This year, we determined the winners by considering their racing accomplishments for the 1989 season. Each selected driver won at least one major national title, which we feel is the most concrete way of determining the hottest drivers for the year! They aren't listed in any particular order; they're all great sportsmen.

• • • • •

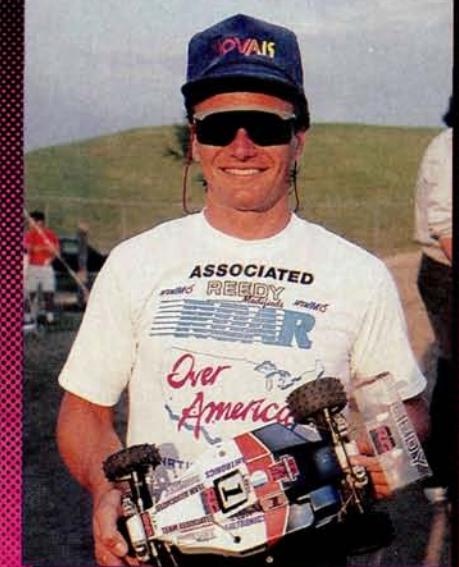
CLIFF LETT

Born: 9/18/57, Long Beach, CA
Resides: Fountain Valley, CA
Height: 5'9.5" **Weight:** 175

■ Won 2WD Modified ROAR Dirt Oval Nationals ■ Won 4WD Modified ROAR Off-Road Nationals
■ Overall Champion Off-Road Reedy International, USA ■ Won 4WD Off-Road Reedy International, Austria ■ Won 4WD Florida Winter Championships ■ Won 1/10-Scale Invitational Class, TRC/Trinity Challenge, Lake Whippoorwill ■ Won 1/10-Scale Modified ROAR Region 6 On-Road Championships
■ Won 1/10-Scale Stock ROAR Region 6 On-Road Championships

Cliff Lett has only been racing for four years, but he's already become a six-time ROAR National Champion! Cliff works full-time in the R&D department at Associated Electrics. He's had major victories in off-road, dirt-oval and on-road racing. This is the second time that he's earned a spot on *Car Action's* Top Ten Drivers list.

CAR ACTION'S TOP TEN



CLIFF LETT

CAR ACTION'S TOP TEN



KENT CLAUSEN

KENT CLAUSEN

Born: 5/18/59, Salem, OR
Resides: Santa Ana, CA
Height: 5'10" **Weight:** 150

■ TQ and 1st 1/12-Scale Invitational Class, TRC/Trinity Challenge, Lake Whippoorwill ■ TQ and 4th 1/10-Scale Invitational Class, TRC/Trinity Challenge, Lake Whippoorwill ■ TQ and 1st 1/12-Scale Modified ROAR Paved Oval Nationals ■ 3rd 1/10-Scale ROAR Paved Oval Nationals ■ Won 1/12-Scale Modified ROAR On-Road Nationals ■ 2nd 1/10-Scale Modified ROAR On-Road Nationals ■ TQ and 6th 1/10-Scale Pro Modified RC Thunderdrome ■ Won Insane Speed Run RC Thunderdrome (70mph) ■ 3rd 1/10-Scale Invitational R/C Car Action Weekend ■ Won 1989 R/C Car Action Pole Position Pro National Championship

Kent Clausen began racing in 1978, driving an Associated 12E. In 1982, he captured the IFMAR 1/12-Scale Stock World Championship. He was also the top qualifier at the 1984 Worlds, but he ran into bad luck in the Main. It's been a great year for Kent; he won two ROAR National Championships and numerous other events. Kent is a co-owner of LAVco.

MINSTRELS OF MAYHEM!

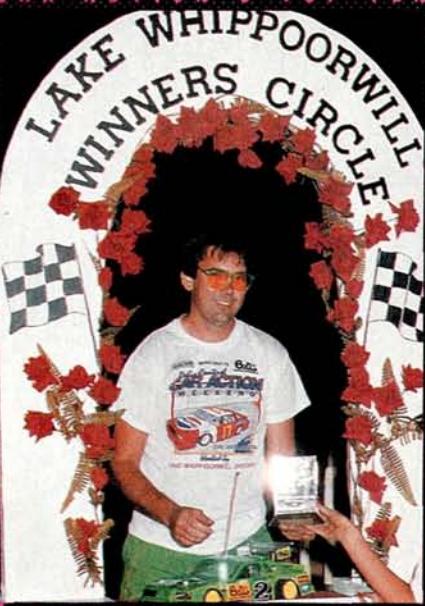
MASAMI HIROSAKA

Born: 2/26/70, Kyoto, Japan
Resides: Tokyo, Japan
Height: 5'4" Weight: 114

- Overall Champion Reedy Japan Invitational Race ■ Won 2WD Japan Off-Road National Championships ■ Won 4WD Japan Off-Road National Championships ■ Won 1/12-Scale Japan On-Road National Championships
- Won 2WD Florida Winter Championships ■ Won 2WD Off-Road Reedy International, Austria ■ Won 2WD IFMAR Off-Road World Championships
- Won 4WD IFMAR Off-Road World Championships

Masami Hirosaka is on a roll! In the past three seasons, he has won four IFMAR World titles. Masami, who has only been racing R/C cars for less than four years, has had success in both 1/12-scale on-road and 1/10-scale off-road racing. He was also named in *Car Action's* Ten Best Drivers list last year.

CAR ACTION'S TOP TEN



BUD BARTOS

BUD BARTOS

Born: 6/27/53, Lorain, OH
Resides: Amherst, OH
Height: 6' Weight: 205

- Won R/C Car Action East/West Superspeedway Shootout ■ Won 1/10-Scale Modified ROAR Region 3 On-Road Championships ■ Won 1/8-Scale ROAR Region 3 Championships

Bud Bartos is known as the "Legend of Lake Whippoorwill," because of his early domination of long-distance races at that track. The owner of Bud's Racing Products, his calling cards are his green apparel and race cars. In '84, he won the 1/8-scale IFMAR Stock World Championship, and he also made *Car Action's* 1989 Ten Best Drivers list. For '90, Bud has decided to get serious about his racing again, and he has started to practice regularly.

RICK HOHWART

Born: 10/13/67, Laguna Beach, CA
Resides: Laguna Beach, CA
Height: 6' Weight: 210

- TQ 2WD Modified Cactus Classic ■ TQ 4WD Off-Road Reedy International, Austria ■ TQ and 1st 1/10-Scale On-Road Reedy International, Austria ■ TQ 1/12-Scale Modified ROAR On-Road Nationals ■ Won 1/10-Scale Modified ROAR On-Road Nationals ■ 3rd 4WD IFMAR Off-Road World Championships ■ TQ 2WD Modified Western Off-Road Championships ■ TQ and 1st 4WD Modified Western Off-Road Championships ■ Won 4WD Modified Peak Performance Off-Road Grand Prix

Rick Hohwart has been racing for nine years, and his first major racing accomplishment was TQing in the '84 Futaba Grand Prix. Although Rick has been concentrating on off-road racing since 1987, his favorite is still on-road racing, where he only competes in the major events. Rick owns Peak Performance, which he started in 1986.

CAR ACTION'S TOP TEN

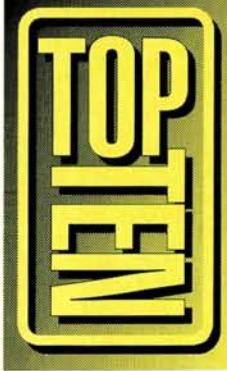


MASAMI HIROSAKA

CAR ACTION'S TOP TEN



RICK HOHWART



DRIVERS

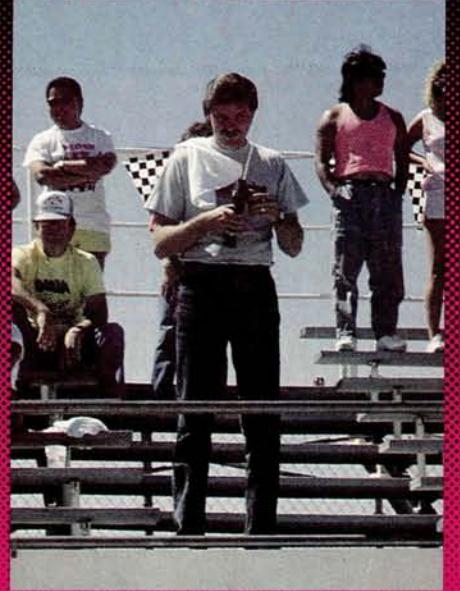
RALPH BURCH JR.

Born: 7/8/67, Denton, TX
Resides: Springdale, AR
Height: 5'11" **Weight:** 150

■ TQ and 1st McCoy 1/8-Scale Gas Race ■ TQ and 2nd 1/8-Scale IFMAR World Championships ■ TQ and 1st 1/8-Scale ROAR Nationals ■ Won 1/10-Scale RC Thunderdrome Superspeedway Race

Ralph Burch Jr. is an accomplished driver in both 1/8-scale gas cars and 1/12- and 1/10-scale electric cars. He has won a total of 14 ROAR Nationals, including 1/12-, 1/8- and 1/4-scale titles. Ralph, who works full-time at Hyperdrive Racing Systems, was also named one of *Car Action's* 1989 Ten Best Drivers.

CAR ACTION'S TOP TEN



RALPH BURCH JR.

CAR ACTION'S TOP TEN



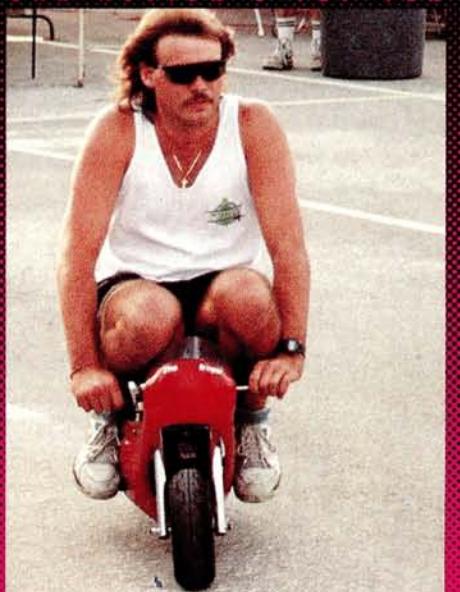
ERIK SODERQUIST

Born: 2/25/68, Alexandria, VA
Resides: San Diego, CA
Height: 6' **Weight:** 160

■ Won 4WD Modified ROAR Dirt Oval Nationals ■ TQ 4WD Modified NORRCA Dirt Oval Nationals ■ TQ 4WD Modified JG Dirt Oval Championships ■ TQ and 1st Sprint Car East Coast Dirt Oval Championships ■ Member of ROAR Off-Road World Championship Team

Erik Soderquist started racing in 1985; he TQ'd at the Western Off-Road Championships a few months later and qualified 3rd in 4WD at the first IFMAR Off-Road World Championships. Erik, a law student who's employed in the R/C industry, has become even more famous since moving into the dirt-oval area.

CAR ACTION'S TOP TEN



JAY HALSEY

Born: 5/16/68, Inglewood, CA
Resides: Hawthorne, CA
Height: 6'1" **Weight:** 170

■ Won 4WD NORRCA Off-Road Nationals ■ Won 2WD Western Off-Road Championships ■ Won 2WD SCORE Off-Road Championships ■ Won 4WD SCORE Off-Road Championships ■ Won Truck Class SCORE Off-Road Championships ■ Won 2WD Cactus Classic ■ 2nd 2WD IFMAR Off-Road World Championships

Probably the biggest name in R/C racing, Jay Halsey has been busy this year. Along with all his racing exploits (he won the 1985 2WD Off-Road World Championships, and he's the only driver to make all six IFMAR Off-Road World Championship A-mains), Jay and his dad Jim have been bringing R/C to the movies. Their most notable contributions are the RC10 chase scene in "The Dead Pool" and the runaway baby carriage scene in "Ghostbusters II."

JOHN "HAMMER" SMITH

Born: 2/3/59, Kansas City, MO

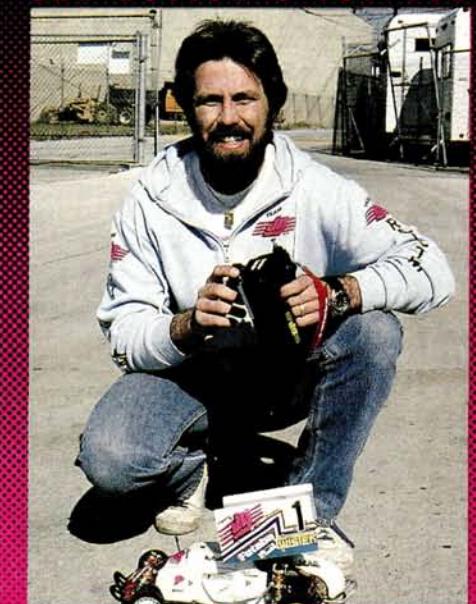
Resides: Carson, CA

Height: 5'9" Weight: 160

■ TQ and 1st Sprint Car ROAR Dirt Oval Nationals ■ TQ and 1st Sprint Car NORRCA Dirt Oval Nationals ■ TQ and 1st Monster Truck JG Dirt Oval Championships

When it comes to sprint cars and R/C racing, one name stands above the rest: John "Hammer" Smith. He was the first driver to win back-to-back ROAR National titles in the same class, and he now holds both ROAR and NORRCA National Sprint Car titles. John works full-time for JG Mfg. as an R&D technical advisor.

CAR ACTION'S TOP TEN



JOHN "HAMMER" SMITH

CAR ACTION'S TOP TEN



JACK JOHNSON

JACK JOHNSON

Born: 5/18/65, Las Vegas, NV

Resides: Rialto, CA

Height: 6'4" Weight: 200

■ TQ and 1st 2WD Stock NORRCA Off-Road Nationals ■ TQ and 1st 2WD Modified NORRCA Off-Road Nationals ■ TQ and 1st Modified Monster Truck NORRCA Off-Road Nationals ■ TQ and 1st 2WD Modified ROAR Off-Road Nationals ■ 8th 2WD IFMAR Off-Road World Championship ■ Won West Coast Truck Championships

Jack Johnson has been jumpin' this year; his off-road exploits attest to that! He started out as a 1/12-scale racer 10 years ago; he got into off-road racing with a Rough Rider in 1980, and he's been racing off-road ever since. Jack has spent the last three years working with Gil Losi Jr. in the R&D department at Team Losi.

ONE TO WATCH

RICKY JORDAN

Born: 2/28/75, Atlanta, GA

Resides: Gainesville, GA

Height: 5'3" Weight: 115

■ 2nd 1/10-Scale Stock ROAR Paved Oval Nationals ■ Won 1/10-Scale Stock ROAR Region 2 Paved Oval Championships ■ Won 1/10-Scale Stock R/C Car Action Weekend ■ 6th 1/10-Scale Stock RC Thunderdrome ■ Won 1989 R/C Car Action Pole Position Stock National Championship

Ricky Jordan has been racing R/C cars for eight years, and he's the current stock-class track record holder at several paved ovals in the Southeast. As his racing career continues, Ricky is switching to the modified class, where his smooth driving style and concentration make him a driver to watch.

CAR ACTION'S TOP TEN



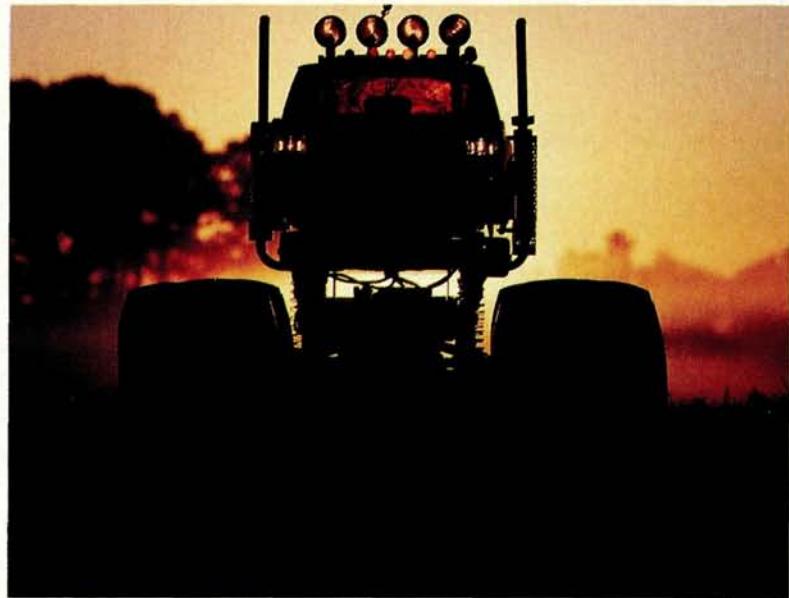
RICKY JORDAN



TOP TEN PHOTOS

• PICK OF THE CLICKS •

AS PART OF OUR overall commitment to delivering the best possible R/C car magazine to our readers, it has always been our policy to include killer photos. If you want to start an argument in the *Car Action* office, just ask who the photographer is! "Ollie" David, "Smitty" Pond and "The Wall" Hemstreet take great pride in their photos, and when it came to choosing the year's Top Ten, each had his own list. Here's what we came up with after the Ayatollah had mediated the dispute: *Car Action's* Top Ten Photos for 1990!



■ SHAKY SHOT

Want to talk menacing? Steve Pond took this shot of Bill O'Brien's Maximum Clod during his winter excursion to Florida. With the lights on and the sun setting behind the Clod, he captured a unique feeling of doom. Steve, who didn't have a tripod, said, "You can't believe how still I had to hold the camera! It took lots of frames to get the good one."



■ FULL PULL

Here's one for all you pulling fans! Dave Sproul cracks the Top Ten with this photo of a *Midnight Express* (from the February article on Supermodified Pullers). It's hard to get good action shots of pullers, because they don't move very fast, but Dave used tire spin and flying dirt to indicate forward motion. It's the most realistic pulling shot to date! Nice job, Dave.



■ DOGFIGHT

Rick Houle grabs 3 spots in the Top Ten. Here's his shot from the NORRCA Off-Road Nationals. You may wonder what happened to the cars in the next frame, but it looks as if we'll never know! A photo like this takes timing, positioning and luck!



■ STREAKERRRR

While covering the ROAR Paved-Oval Nationals at the Peachbowl last summer, Rich Hemstreet pulled a rabbit out of the hat with this super shot of Ricky Jordan's Concours car. While it looks as if it's going 700mph and could break the sound barrier at any moment, the car is really sitting still! Rich pulled this off with the use of a special filter, so proving to us purists that they may not be such a bad idea.



■ SCREAMING FOR VENGEANCE

When Steve went on vacation, we sneaked the Project Blackfoot into his suitcase! While the beach isn't necessarily the place to race your modified monster truck, there's nothing like a romp in the sands of Southern California. Steve took the highly modified Blackfoot down to La Jolla, where he and a friend livened things up a bit!



■ PATRIOTIC POUNDER

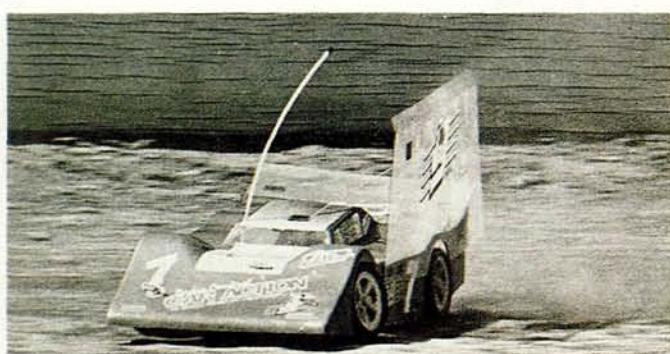
Rick Houle's awesome shot of the star-spangled Royal Crusher shows the kind of abuse to which monster trucks are subjected. Out of sight to the left are a couple of off-road cars in post-crunch condition, while center stage, the sailing Crusher seeks its next victim! If you squint, it looks like a full-scale monster truck scaling some spectators. I guess beauty is in the eye of the beholder?!

■ VICTORY!

Who says it has to be a car to make the Top Ten?! While in Australia, Rick Houle captured the moment as Masami Hirosaka celebrated with his Dad Masaaki (on his left) and Yokomo owner Tom Yokobori (on his right), after becoming the first driver to sweep both the 2WD and 4WD Class at the World Championships. This was definitely one of the highlights of the '89 racing season.

■ AIR TIME

Every once in a while, you hit the jackpot with a shot like this one of the Horizon TQ10. The site was an off-road track in Fairfield, CT, and club racer Jay Garcia was at the wheel. Steve likes to work with cars like this, because they do all the work! He says, "If you're in the right place at the right time, shots like this just happen."



■ THE RAGGED EDGE

Wally took this dynamite shot of the JG JR-X2 dirt-oval conversion before he joined us full-time. "It would have been nice to shoot the car in color," he said, "but it's the only black-and-white shot ever to make the cover!"



■ LINEUP

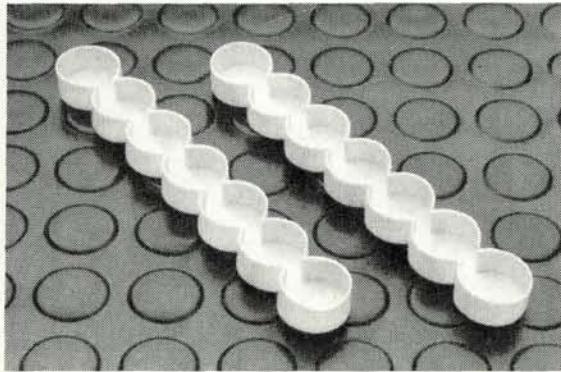
It seems dirt-oval was where it was at for Wally this year. The Parade of Cars photo was made popular by Rich Hemstreet, but Wally used it to great effect at the ROAR Dirt-Oval Nationals. His pal (and *RCCA* writer) Bill Henning's number 80 concours car is front and center.



A C C E S S O R I E S

TO CHOOSE THE TOP TEN ACCESSORIES for 1990, *Car Action*'s editors looked over the vast array of accessories available to R/C car enthusiasts. With so many products in the running, it wasn't easy—it would have been simpler to pick the top 50!—but after some arguing, we did it!

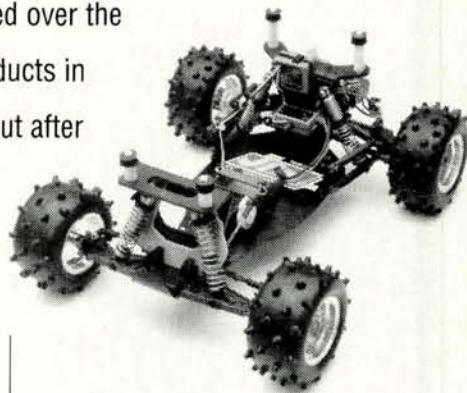
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ends, flip the pack over, pull off the first Pal and solder the other side. When the soldering is complete and both Pack Pals are in place, your batteries won't short out on a graphite chassis or weld themselves to a Dominator's drive chain. Pack Pals are easily trimmed for 6-cell applications.

Dan's RC Stuff Battery Pack Pals

Dan's Battery Pack Pals can be used as a soldering jig and a pack protector for storage or while racing. By putting loose cells in one Pack Pal, you expose their opposite ends, so they can be soldered together without gluing. Pop a second Pal over the freshly soldered



JG Manufacturing JR-X2 Monster Truck Conversion

JG's Monster Truck Conversion Kit for the JR-X2 is probably the most effective conversion kit available. Rock-solid body mounts keep the body securely attached to the chassis, and the direct bolt-on wheels don't need adapters, so they're extremely sturdy. Knobby tires and a Ford F150 body complete the package, which is ideal for anyone who wants to convert a JR-X2 to a monster truck.



Track Master Blackfoot Turbo-Glide

Track Master's Blackfoot Turbo-Glide Transmission is a direct replacement for Tamiya's popular Blackfoot. This belt-driven transmission has a fully adjustable ball differential, and it can use a wide range of pinion- and spur-gear combinations to provide many gear ratios. It will also fit the Monster Beetle and Mud Blaster.

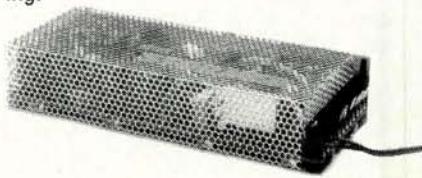


Premier Design Bat Wedge

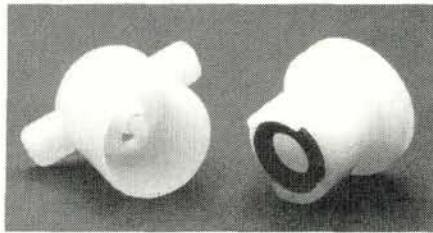
The Bat Wedge body from Premier Design is bound to be a hot item in '90. This menacing machine is reported to hook-up really well on dirt-oval cars. While "purists" may not appreciate seeing it on the racetrack, the "silver screen" crowd has flipped over it!

Monolithic Max Amp 35Q

The Max Amp 35Q power supply is a real workhorse: its two 13.5V, 15-amp outlets provide plenty of filtered charging power for racing. Two separate 4 to 6V outlets (that can handle 50-amp spikes) can run a dyno and a motor-comm truing machine at the same time, or separately. The 35Q is manufactured by Monolithic and distributed exclusively by Stormer Racing.



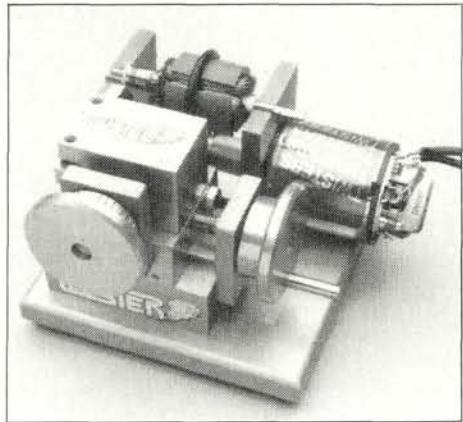
TOP 10 ACCESSORIES



Cheetah Racing Blaster Plus

The Cheetah Bearing Blaster may look simple, but it's essential for keeping your car in top racing condition. The Bearing Blaster Plus accommodates just about every size of bearing used in 1/10- and 1/12-scale R/C racing. Simply enclose a bearing between the halves of the Blaster

Plus and spray it liberally with motor spray. As the spray is forced through the bearing, debris is flushed out! The Blaster Plus is designed to fit over the end bell, so that the end-bell bearing can also be cleaned.



Twister Pocket Comm Lathe

The Twister Comm Lathe is a life-saver for serious modified racers. This high-precision machine allows you to true the commutator of any modified motor to remove carbon build-up and other imperfections caused by hard use; now, you won't have to send your motors back to the factory to be rebuilt! With clean bearings and a new set of brushes, your motor will be as good as new.

Team Astro Constant Current Charger

Astro's Model 112 DC/DC charger is great for drag racers, sled pullers and other specialized R/C vehicles that use more than the standard 6- to 7-cell packs. Model 112 has enough brute power to charge up to 28 cells simultaneously, but it can also charge only one cell! This makes it ideal for charging transmitter and receiver packs down to 250mAh. The 112 has many standard features, including an ammeter, a 15-minute timer, and fuse- and diode-protected circuits.



Tekin Reflex Charger

Tekin's latest charger—the BC210, or Reflex Charger—is quickly earning a reputation as one of the industry's best. The BC210 resembles previous Tekin chargers, but it features all-new reflex-charging technology. Designed to rejuvenate your batteries, this reflex charging breaks away the crystal that forms around the plates as a result of low charge rates and high discharge rates. The BC210 also has a soft-pulse mode, which many think is the best charging method for SCE batteries, and it's economically priced, compared with the superchargers.



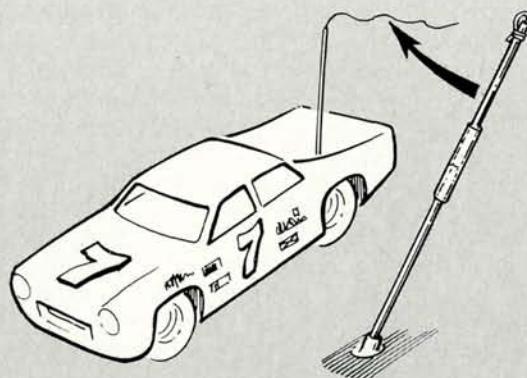
Futaba PCM

Futaba's PCM was the easiest of the Top Ten Accessories to decide on; it's the best radio system on the R/C market—hands-down! The PCM operates on a pulse-code system, which essentially transmits the signal in computer language. The receiver then decodes the signal and sends it to the correct channels. This system is virtually free of interference and operates at a very high pulse rate to prevent servo jitters. Also included are tuning features that allow this radio to be used in most surface applications.



PIT TIPS

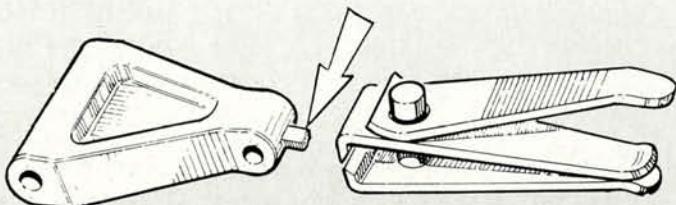
During the past year, *Car Action* has been on the receiving end of a flood of "Pit Tips." Some of these have saved people money; others have helped to keep vehicles on the track; and some have made assembly easier. These tips, along with Jim Newman's illustrations, have helped everyone from average enthusiasts to experienced racers. The tips repeated here have proven themselves worthy of inclusion in *Radio Control Car Action's* Top Ten Pit Tips for 1990.



INCREASED RADIO RANGE

Here's a suggestion for the piece of antenna wire that trails from the top of the antenna tube: using a plastic sleeve over the outer diameter, this car owner extended the plastic tube so that the extra wire is vertical and secured at the top in the usual way. He now claims a significant increase in radio range. Do not cut off the excess wire!

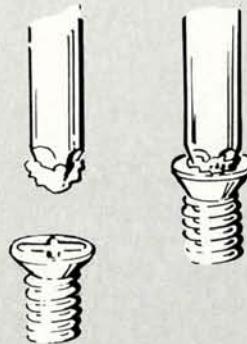
Bryan Bates, Airdrie, Alberta, Canada



TRIMMING MOLDED PARTS

Instead of slicing and filing, try using nail clippers to remove flash or molding gates. Dan says they trim flush and "clean as a whistle."

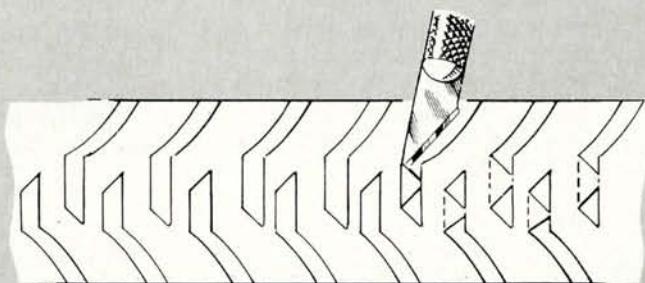
Dan Tan, Scarborough, Ontario, Canada



SCREW STARTER

To make it easier to start a screw in hard-to-reach places, some method of holding the screw to the screwdriver is needed. Put a blob of sticky grease on the end of the screwdriver!

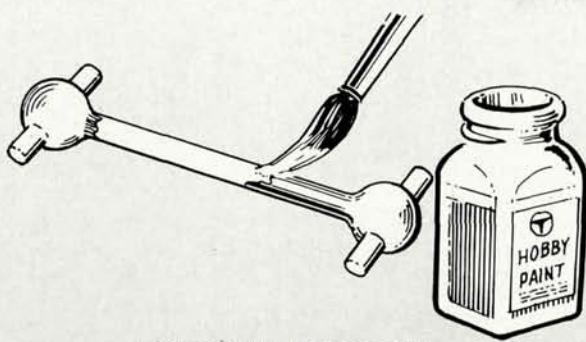
Bill Carr, Edwards, NY



TIRE TREAD MODIFICATIONS

Our adventuresome contributor experiments with different tread configurations by using a lubricated modeling knife to slice out tread blocks. Here he appears to be trying to improve on the self-cleaning ability of the tread pattern—an interesting experiment!

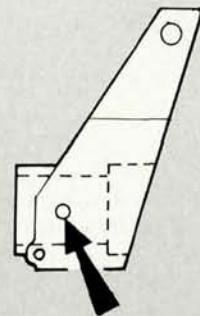
Rod Martin, Saugerties, NY



HIGH-VISIBILITY DOGBONES

Paint your dogbones (even steering links) a bright color, e.g., yellow, white, or orange, so that if they *do* fall off, you'll have a reasonable chance of seeing them in the dirt. (For a neat method of retaining your car's dogbones, check "Pit Tips" in the June '88 issue.)

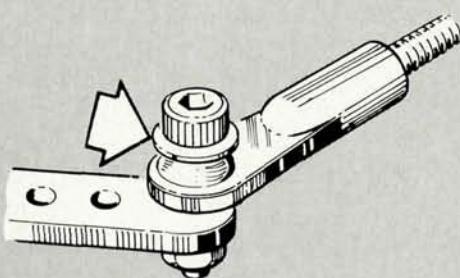
Robert Barrosa, South Gate, CA



RC10 BEARING CLEANING

To make cleaning easier, drill a $\frac{3}{32}$ -inch hole through the side of the rear hub carrier (arrowed). Insert the nozzle of a pressure can into the hole, and blast dirt out of the bearing in the opposite direction from which it entered. Then spray your favorite lube into the hole, and seal with tape or a "plug" cut from a toothpick.

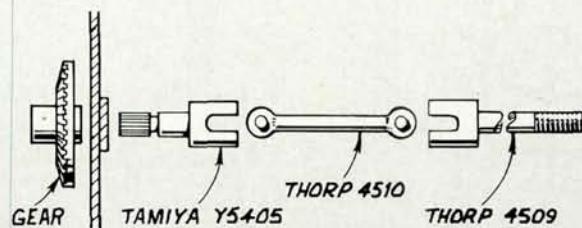
Kerry Stevens, Spokane, WA



BALL-JOINT SAFETY

Straight from aviation, here's a safety tip that prevents a ball joint from totally disconnecting if it pops loose. Place a washer on each side of the ball joint, making sure that the washers are slightly larger than the hole in the ball joint so that they can't pull through.

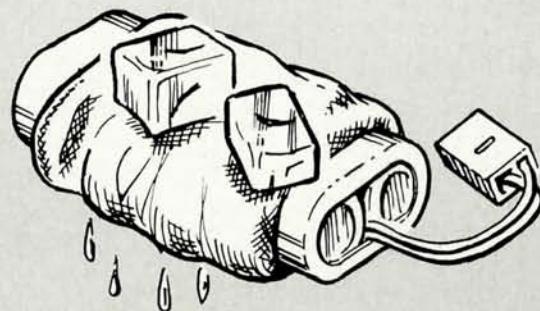
William R. Paone, Aurora, CO



BLACKFOOT PLUS THORP

The tougher Thorp axles can be used on the Blackfoot if you use the Tamiya Boomerang/Hot Shot/Super Shot original gears. The gear and gear case shown represent all Frog-type gear cases—just order the parts numbered.

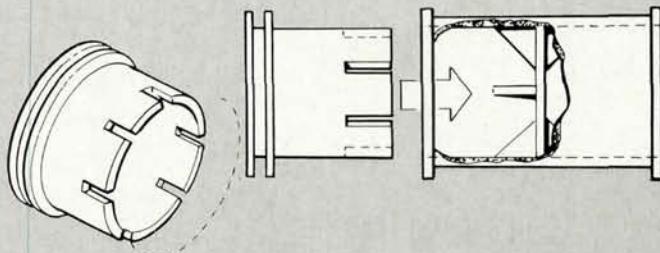
David J. Day, Stevensville, MD



NI-CD COOLING

Here's a quick way to cool Ni-Cds: wrap the pack with a cold, moist cloth or paper towel so that the evaporation rapidly dissipates the heat. You could even put an ice cube or two on the cloth as a source of ice water.

Chad Barnhart, Johnstown, PA



BLACKFOOT/CLOD BUSTER TIRE ADAPTATION

Now you can use the many Clod Buster tire options on your Blackfoot. Cut the outer rims off the stock Blackfoot rims; then notch the hub to fit over the webs inside the Clod Buster hubs. Secure them with $1\frac{1}{2}$ -inch machine screws and nuts.

Dennis Tietyen, Milwaukee, WI

TOP
TEN

READERS' ILLUSTRATION

THE LORD OF THE BOARD

Some months ago, *Car Action's* art director started a collection of readers' illustrations. Here are the Top Ten, which we dug out of the Lord of the Board's horde!

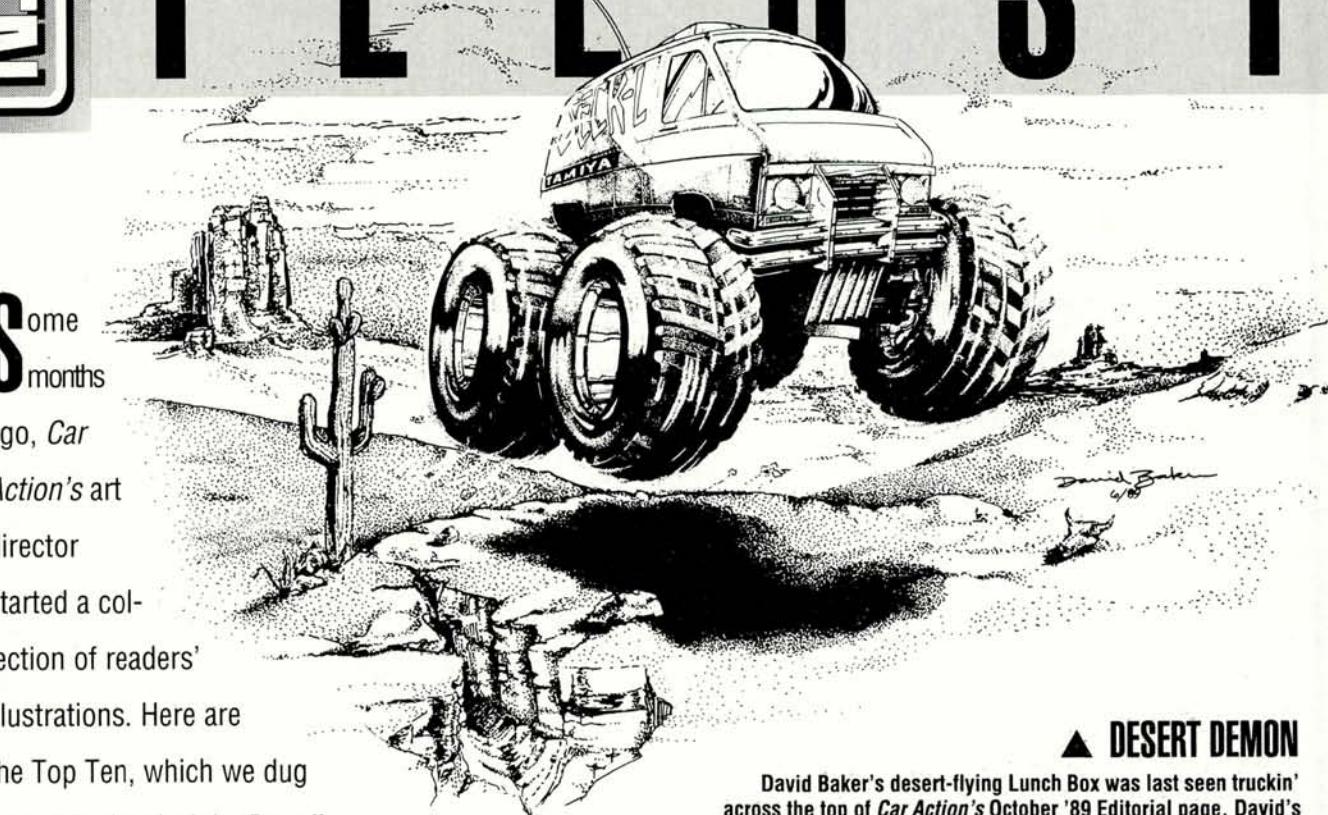


▲ HEAVY METAL CHEVY

From Johnstown, PA, comes the Chevy Scottsdale of Scott Robinson. This 4WD behemoth has a 454 under the hood and Radical tires all around.

SUPER CANADIAN MONSTER BEETLE ▶

The Lord's collection includes this "Super Canadian Monster Beetle," courtesy of Clifton Velasco of Vancouver. Clifton's Beetle even has a personalized license plate that reads CAN-BUG.



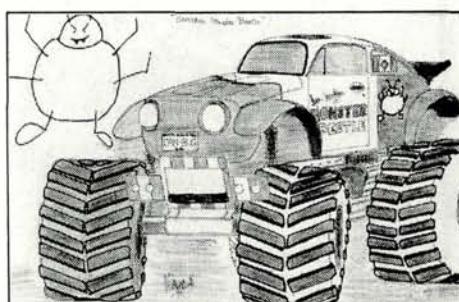
▲ DESERT DEMON

David Baker's desert-flying Lunch Box was last seen truckin' across the top of *Car Action's* October '89 Editorial page. David's attention to detail caught the Lord's eye immediately.



▲ WHEELIE BUGGY

From Winnipeg, Canada, comes Eric Saltel's contribution to the Lord's horde. This Buggy is definitely overpowered, but fear not; Eric is at the controls.

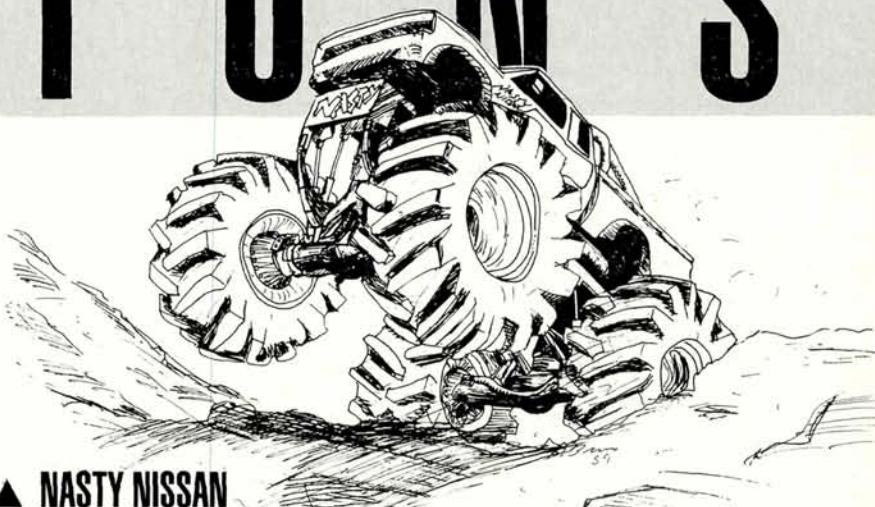


RATIOTIONS



▲ IMPORT EATER

This offering is from Mark Jindra of Garfield Heights, OH. He used a JG RC10 conversion kit with an MRP Baja body and Pro-Line tires, then put himself behind the wheel.



▲ NASTY NISSAN

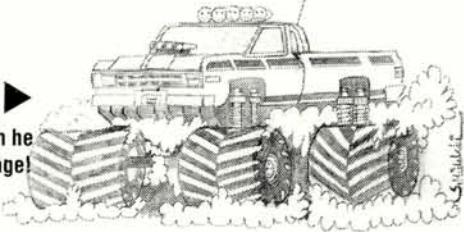
Dan Burn's Nasty Nissan looks menacing as it flies over a rise. This monster terrorizes the turf around Dan's hometown of Laurel, MT.



◀ CURB SLAMMIN' SABRE

Jason Adams sketched his Super Sabre before slamming it into a curb at 20mph, (\$40 of damage!) From Savannah, GA, Jason's only been R/C'ing for a few months.

DREAM MACHINE ▶

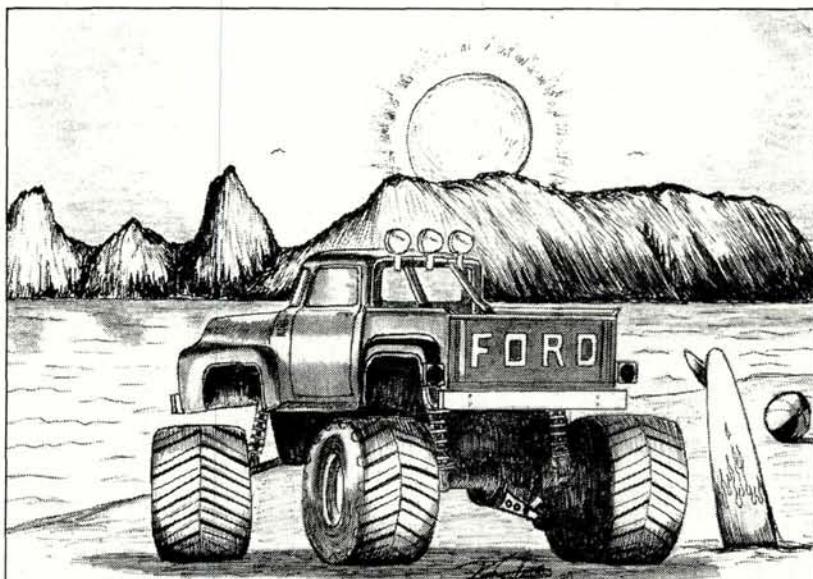


Thirteen-year-old Simon Michalski of Victoria, Australia, drew his dream Clod Buster, which he hopes will be the next addition to his growing R/C garage!



▲ ONE HOT COVER

Here's Keith Nelson's tribute to all the hot covers our Lord of the Board has cranked out. Keith even listed him as the driver of the Need-4-Speed funny car at the top of this awesome cover!



▲ SUNLIT PUMPKIN

Our art director wants to know where this tranquil setting is, so that he can check out the fishing next to Tom Cordova's Midnight Pumpkin! Tom hails from Norfolk, VA.

SCOPING OUT

by JOHN RIST

TRAXXAS XL-2: A SMOOTH PERFORMER



The XL-2 is another in the Traxxas line of reasonably priced ESCs. It features fully proportional forward and brake, and built-in heat sink and forward-neutral LED.

NEWCOMERS TO RACING often ask me how they can make their cars go faster. I tell them to replace their bushings with ball bearings and their mechanical speed controllers with the best electronic speed controllers they can afford. The ball bearings reduce the mechanical friction (or drag), and the electronic speed controllers reduce the electrical friction that causes power loss.

If you replace the mechanical speed controller, you can get rid of the dropping resistor, which gets very hot and wastes power. Only two things should get warm: the battery, which generates power to run the car, and the motor, which burns the power it takes to run it. Any other "hot spots" should be eliminated. Traxxas* offers two electronic speed controllers: the XL-1 with forward, reverse and brakes (I

reviewed it in the March issue), and the XL-2, which is forward-only with brake. Here are some of the features of the Traxxas XL-2:

- fully proportional forward and brake
- large, built-in heat sinks
- built-in, forward-neutral LED
- full set of connectors—Tamiya-style for the battery; bullet-style for the motor.

Inside the brightly colored box, I found a medium-size electronic speed controller and a set of instructions, which could have been better. The XL-2 is small enough to fit inside most 1/10-scale cars, and it will definitely fit any truck, but the instructions don't include a drawing that shows how to connect the controller's many wires. There are step-by-step instructions, but statements like, "connect the motor wires," aren't much good if you aren't sure which wires they are. If you're a beginner, get help from your local hobby shop.

I took the XL-2 apart to check the workmanship: the construction is standard and the solder joints looked good. One of the motor wires was connected to the battery connector instead of coming from inside the speed controller—a somewhat unusual, but good, way to get power to the motor, because it reduces the length of the wires that go to it. My tests have shown that wires and connectors are responsible for most of the power loss in an electronic speed controller, so anything

THE "SCOPING OUT" LAB

John Rist's lab consists of:

- an oscilloscope
- a digital voltmeter
- a resistor load bank
- a 6V 30-amp electricity supply
- a Pit Stop Radio servo/speed controller tester.

The oscilloscope is used to monitor the controller's output and to guarantee that it's fully on. The digital voltmeter takes all the voltage-drop readings and verifies the reading on the current meter.

The resistor load bank consists of 40, 12-ohm, 5-watt power resistors, which can be switched on and off one at a time to vary the load between .6 amp and 20 amps.

In series with the resistors is a 25-amp Simpson current meter and a 1-percent .01-ohm resistor. By measuring the voltage drop across this resistor, the current-meter's reading can be double-checked. Of course, the lab power supply provides the test current.

TRAXXAS

XL-2

DIMENSIONS:

Height (with heat sink)	1 inch
Width	1.38 inches
Length	1.63 inches
Weight	2 ounces

TUNING:

Access to Controls	Excellent
Ease of Adjustment	Fair

PRICE:

Suggested Retail	\$70
Warranty	30 days

ELECTRICAL:

(Manufacturer's Specs)

Max Voltage	9.6 volts
Min Voltage	4.8 volts
Max Current Forward	300 amps
Continuous Current Forward	100 amps

Resistance not specified

TEST PARAMETERS:

Voltage	6 volts
Current	12 amps

TEST RESULTS:

Voltage Drop w/connector	.51 volt
Voltage Drop, 2-inch wire	.30 volt
BEC Output, 6-Cell Battery	5.60 volts
Resistance w/connector*	.042 ohm
Resistance, 2-inch wire*	.025 ohm

*Resistance=Voltage Drop/Amps

COMMENTS:

The size, weight and performance of this forward-only-with-brake ESC places it in the medium-performance class. It has smooth throttle response and delivers good run times. The brakes are slightly soft, but they should be adequate for most racing. The built-in LED doesn't accurately indicate the full-throttle point, but I was able to set this point by listening for maximum motor speed. At a suggested retail price of \$70, the Traxxas XL-2 is a good buy for those who want to replace a mechanical speed control with a racing ESC.

ROCK BUSTER



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Two wheel drive.
Rear differential.
RS-380 motor.
Spring shocks.
3 speeds.
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RS-540 motor.
Oil filled shocks.
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Front torsion bar.
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Fused circuits.
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indicators.
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Six cell hump or
flat packs.
Seven cell flat packs.
Matched 1500mAh
fast charge cells.
8.4V: #11708 (flat)
7.2V: #21335 (hump), #21467 (flat)



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Cincinnati, Ohio 45236/1288
Phone: (513) 793-5900
Fax: (513) 793-7337

that reduces wire length in the battery-to-motor loop is a step in the right direction.

LAB TESTS

I connected the XL-2 to the test equipment in my "Scoping Out" Lab. With the XL-2 pumping a hefty 12 amps, I measured a .30 drop in voltage and calculated that it had .025-ohm resistance (not as good as some of the more expensive electronic speed controllers, but it's better than the .04 ohm of the Traxxas XL-1 reversing speed controller). As I've said before, a racing-style speed controller (forward-only with brake) has a lower resistance than a reversing speed controller, because its red motor lead goes directly to the battery instead of passing through the FETs.

My next test was the "let-it-cook special." I increased the current to 15 amps and let the controller operate for 15 minutes without providing any cooling air (which is obtained when air circulates over the heat sinks in a moving vehicle). After 15 minutes, the speed controller was very hot, but it was still operating normally. If you plan to use your speed controller with modified motors and hammering 7-cell batteries, make sure that plenty of cool air can reach it.

Next, I ran the dead-short test to find out if the speed controller would survive when the motor gears jam or the wire shorts out. When I put my dead-short jumper across the XL-2's motor leads for 10 seconds, the wiring and the speed controller became hot enough to fry eggs. After I had removed the short and allowed the controller cool off, it was soon back to normal. If you refrain from holding the pedal to the metal when something goes wrong, the XL-2 should survive. Present-day electric R/C cars and trucks handle awesome amounts of power, and it's easy to destroy expensive batteries, motors and speed controllers if you don't shut them down quickly when there's a problem.

CAR TESTS

The time had come to install the Traxxas XL-2 in my trusty Ultima. I've installed a

(Continued on page 104)

TRACK REPORT



9

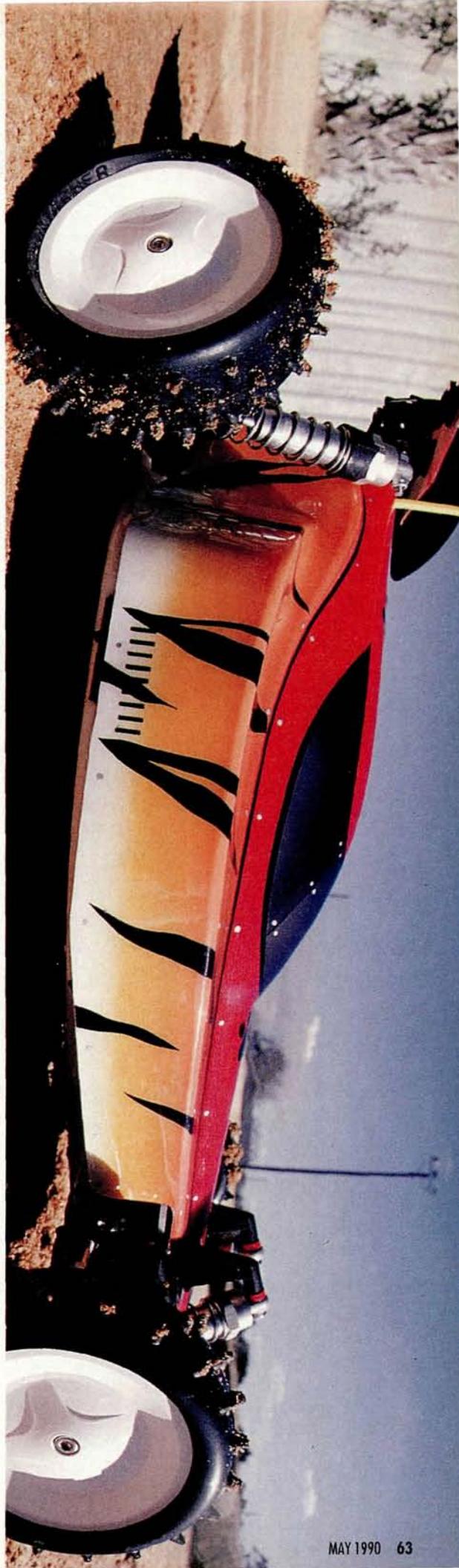
LIVE DRIVE

JUST HOW FAST does Schumacher* expect its 4WD Cat to go? I'll tell you: it isn't much faster than its earlier incarnations—it was already fast and nimble—but this new breed of Cat has been refined to go faster, *longer*.

The latest in Schumacher's line of competitive 4WD cars, the Pro Cat includes some much-needed improvements. The Cat and the Cat XLS weren't slouches in the performance department, but compared with other four-wheelers in the same category, they were rather pale as far as maintenance was concerned. Although they were very fast, they were difficult to keep race-tuned.

KIT CAT

The Pro Cat shares many of the original Cat's basic features, but a few updates keep it going fast for longer. The standard Cat features include

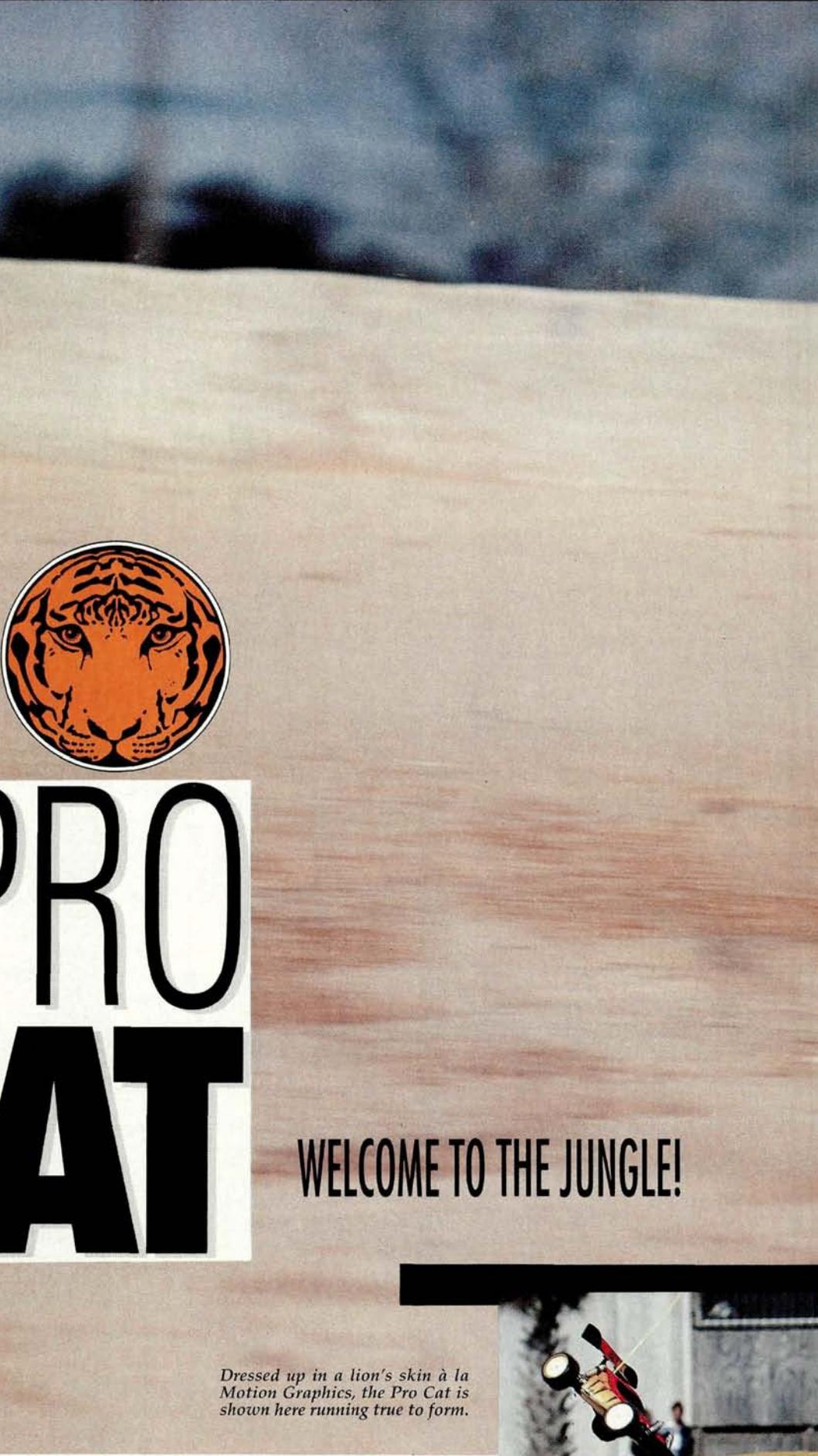


by STEVE POND

a fiberglass-plate chassis, which is usually shunned in racing circles because of its flexing and weight, but Schumacher uses a thinner chassis plate with an upper plate. This makes the chassis as stiff as a graphite one, and only slightly heavier. Four-wheel independent suspension is still standard, and this is damped by an oil-filled coil-over shock on each corner. For more consistent damping, the shocks have rubber pressure gaskets that prevent air from mixing with the oil.

The Pro Cat also comes with a belt-drive system, bellcrank steering, a crash-back front end, one-way front drive shafts, turn-buckle linkage, ball differentials (front and rear), a polycarbonate body and undercowl, and light, one-piece wheels on which Schumacher's unique pin-spike tires are mounted.

Although the improvements are minor, they do help to keep the Pro Cat in tune longer. The most noticeable change is the addition of a saddle-pack chassis. The XL and XLS versions used stick packs, which are difficult to assemble if you want to use matched batteries. The new, wider, saddle chassis has seven battery slots to accommodate the 7-cell voltage demons. Unique

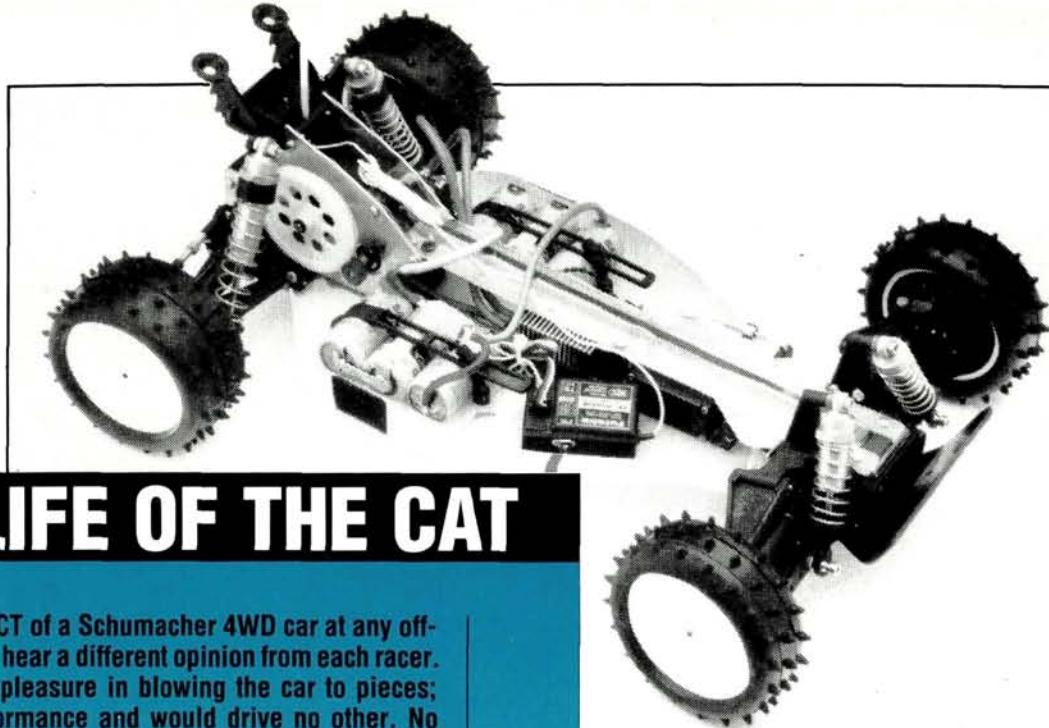


Dressed up in a lion's skin à la Motion Graphics, the Pro Cat is shown here running true to form.

PHOTOS BY STEVE POND

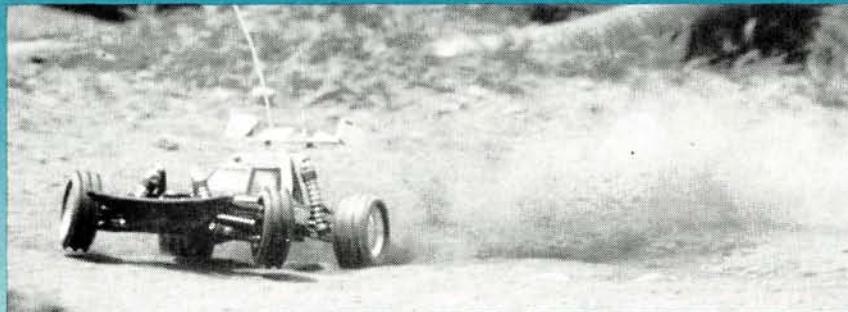


PRO CAT



THIRD LIFE OF THE CAT

BRING UP THE SUBJECT of a Schumacher 4WD car at any off-road track, and you'll hear a different opinion from each racer. Some would take great pleasure in blowing the car to pieces; some swear by its performance and would drive no other. No matter what the opinion, the fact remains that these cars are among the most competitive in the world, as Masami Hirosaka



proved when he won a decisive victory at the 1987 World Championships as a virtually unsponsored racer.

Schumacher entered the off-road market with the XL version of the Cat. Although the car was competitive, some of the ingredients were missing. With only one-way bearings on the front drive shafts to act as a diff during cornering, the XL demonstrated more push than was desirable on some tracks, and there was no way to adjust the amount of power going to the wheels. The car also had a narrow stance, which compromised cornering when the tires really dug in.

The XLS—an updated version of the XL—had a new, front ball diff, which, in addition to the one-way drive shafts, allowed the car to corner more quickly. The kit also included spacers, which were inserted between the suspension arms and the chassis; this widened the car's stance and gave it firmer footing.

The XLS is the same version that brought Masami to victory in Romsey, England, but there was still room for improvement. The chassis was cramped for space, and it was designed to use stick packs (which made it difficult to use matched packs, because they're only available unassembled). To keep up with growing demands, Cecil Schumacher went back to the drawing board, and the result is the new Pro Cat.

Throughout the transformation, Schumacher has stayed with the same basic design, to which all of the updates can be adapted. Even if you own the very first XL Cat, you can buy the updated or new parts, piece by piece, until you have a Pro Cat. How 'bout that?!

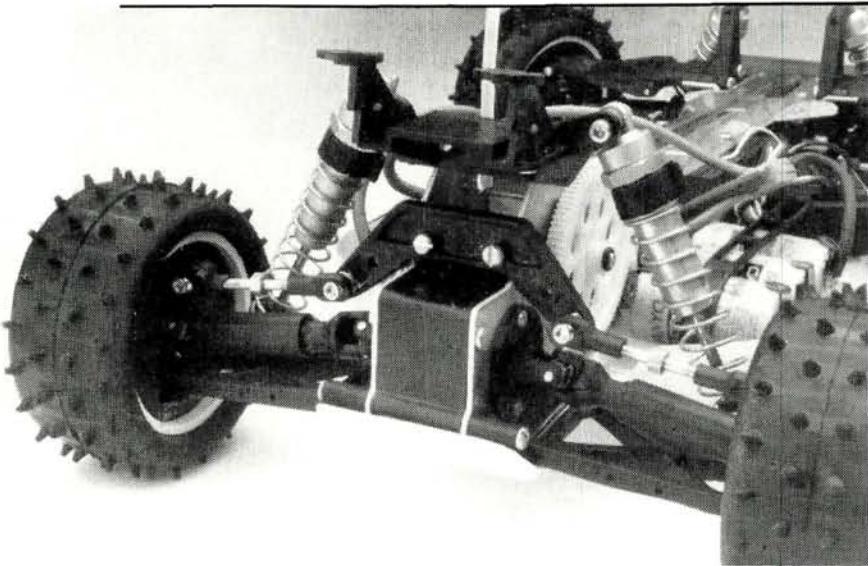
battery straps are also part of the package; these make it considerably easier to install and change the saddle packs. The straps are attached to the chassis behind each group of cells, and they stretch across to a hook just in front of the cells. This may not sound like such a big deal, but if you've had to fuss with strapping tape, these hold-downs are a welcome improvement!

The transmission is another part of the Pro Cat's make-over. The XLS's integrator system was very complicated; instead of this, the Pro Cat has a solid drum on which the belts in the tranny ride (this is similar to the pro diffs that are available for the XLS). The over-complicated differential shaft has been ditched in favor of a simple layshaft, which drives two short belts that are connected to the rear diff. Driving the layshaft is a new, quick-change spur-gear assembly, which was borrowed from the Top Cat 2WD car.

Also from the Top Cat are the lower A-arm supports and the modified wing mount. The new, rear A-arms look like those used on the Top Cat, but there's a slight difference in length. These A-arms eliminate the need for the unnecessary toe adjusters on the rear; instead, there's a fixed mount with adjustable upper links.

ASSEMBLY

Assembling the Pro Cat was quite a task, not because it's extremely difficult to build, but because the kit I had was one



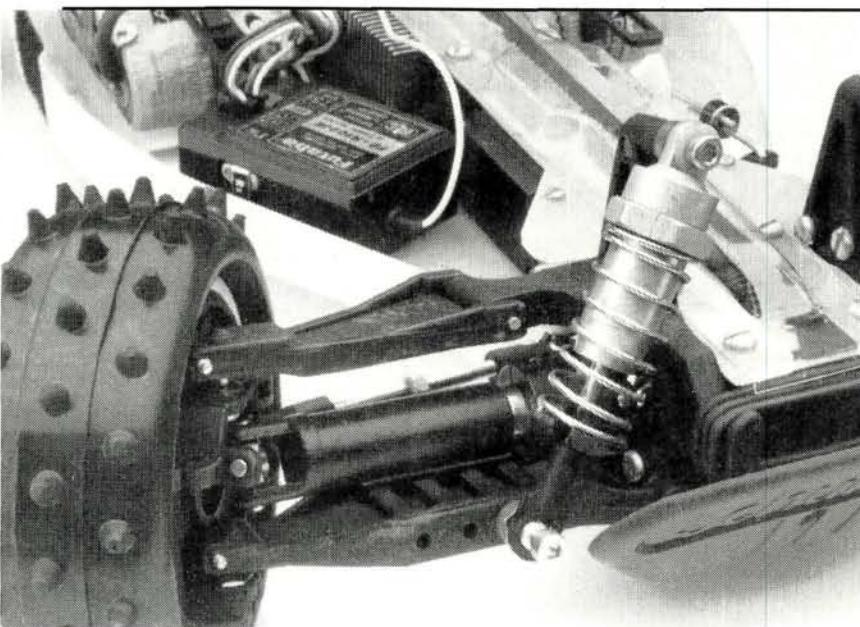
From this vantage point, many of the updates are visible, including the rear A-arms and upper control links, the control-link mount and the combination wing support/shock tower.

of the first off the production line, and the instructions were still in the works. I decided to wing it with an instruction book from my XLS Cat, and I managed to go through the entire assembly with only one mistake (the steering linkage was backward, but it works just as well either way).

When the manual became available, I read through it to see if I could find any trouble spots that weren't clearly explained. With the exception of some British phrases (they say "cheese-head screw" instead of pan-head screw, "spanner" instead of wrench, and "rose

joint" instead of ball joint), the instructions seem to spell out the assembly pretty well.

I'd add only one step to the instruction manual. Although conductivity isn't as much of a problem with fiberglass as it is with graphite, the edges of the battery slots should still be filed to remove the sharp edges. Not only will this protect the insulation on the battery from being cut, but it's also necessary if you use cells that have an extra layer of shrink-wrap (e.g. the Magic Motorsports* matched packs I used). With this extra layer on the cells, it's very



With the exception of a belt-tension adjuster, the front end of the Pro Cat remains essentially unchanged.

BUYERS BEWARE

OF MISLEADING CLAIMS!

BEWARE of "silver plated" wire that contains no silver!

BEWARE of "13 gauge" wire that is actually 14 gauge!

BEWARE of solid connector bars that are claimed to be "superior" to braid!

IN FACT, only Stage III produces wire products specially designed to exceed R/C specs!

■ **ULTRABRAID** has the lowest load resistance of any shunt connector.

■ **SUPER 13** has the lowest resistance and highest strand count of any 13 gauge, 805!!

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AND, ALL of our wire products are the purest possible copper, tin electro-plated for corrosion resistance and fast, easy soldering.

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SCHUMACHER

PRO CAT

Type Off-road 4WD
 Scale 1/10
 Sug. Retail Price \$399.99

DIMENSIONS:

Overall Length 16.25 inches
 Width 9.75 inches
 Height 4.25 inches
 Wheelbase 10.75 inches
 Front Track 8.5 inches
 Rear Track 8 inches

WEIGHT:

Gross (w/bat.) 56 ounces

BODY:

Type Off-road buggy w/body pan
 Material Polycarbonate

CHASSIS:

Type Double plate
 Material Fiberglass

DRIVE TRAIN:

Primary Pinion/spur
 Transmission Belt drive
 Differentials Ball diffs
 Bearings Ball bearings

SUSPENSION:

Front: Type Upper and lower A-arm
 Dampening Aluminum, oil-filled, coil-over shocks
 Rear: Type Lower A-arm w/upper control link
 Dampening Aluminum, oil-filled, coil-over shocks

WHEELS:

Front: Type One-piece plastic
 Dimensions (DxW) 2.25x.86 inches
 Rear: Type One-piece plastic
 Dimensions (DxW) 2.25 x 1.25 inches

TIRES:

Front/Rear Low-profile, pin-spike

ELECTRICS:

Motor 05/540*
 Battery 6- or 7-cell pack*
 Speed Controller Electronic*

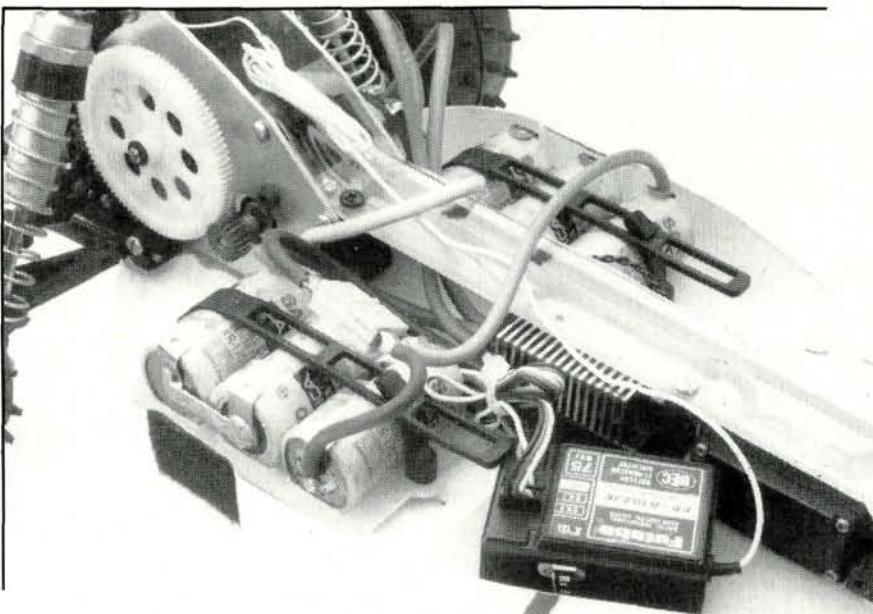
OPTIONS AS TESTED:

Trinity King Kong 1700 Series modified motor; Magic Motorsports matched SCE packs; Tekin ESC 700 Pro Pulse speed controller; Futaba Magnum Jr. radio and FP-S131S high-torque servo.

COMMENTS:

The Pro Cat is just as fast as the Cat XLS, but it stays fast longer. A new tension adjuster keeps the belt from loosening, but it still tends to walk off the front diff pulley. The instruction manual has been greatly improved. This latest version of the Cat is a very fast, competitive car that's able to run with the best of them.

* not included



The Magic Motorsports matched SCEs are held in with new, quick-change battery straps. Notice the new spur-gear quick-change design, which allows rapid changes: you only have to remove the O-ring in the center.

difficult to hook up the battery straps. If you file the slots, the cells will sit low enough for you to fasten the strap easily.

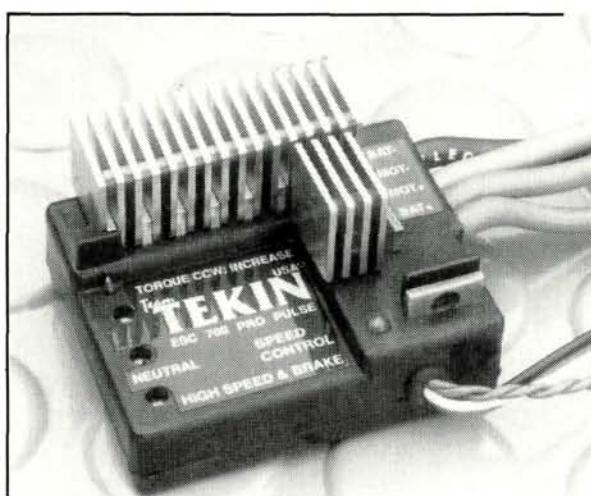
The final step to get the Pro Cat from the workbench to the race track is the installation of the accessories that aren't included in the kit: motor, batteries, radio and speed controller.

To ensure the best possible performance, I used accessories that are on the same level as the Pro Cat. For batteries, I used the new Magic Motorsports matched packs. They're available in many configurations, but I chose 6-cell packs, because that's the direction in which many racing organizations are moving. The packs come pre-soldered with braided shunts and a jumper wire.

For radio gear, I chose the Futaba* Magnum Jr., which is very easy to hold. Its components have been redesigned to improve performance. The standard receiver is considerably smaller and lighter, and the radio is available with a variety of servos for various applications. I also used Futaba's optional FP-S131S high-speed, high-torque servo. This servo has very good speed and a monster 60 ounce/inches of torque (almost twice that of the standard servo in many radio systems).

I used the new Tekin* ESC 700 Pro Pulse electronic speed controller, which was designed for use with the brute-horsepower motors common in 4WD modified racing. It has 11 Mosfets, one of which is reserved as a voltage regulator. The 700 has all the features of the popular, high-performance controllers, as

(Continued on page 114)



The brand-new Tekin ESC 700 Pro Pulse speed controller is one of the most incredible speed controllers available. It's designed to extend run time and reduce wear on the motor and brushes.

Kyosho Puts 1/8 Scale Gas on the Fast Track

by Bill Jeri

Kyosho is launching a full scale campaign to bring 1/8 scale gas off-road racing to the attention and enjoyment of American R/C racers with a new series of sponsored races. The "Kyosho 1/8 Scale Off-Road Challenge" race series will work to bring you the best in experienced gas racers plus new entries from the ranks of electric racers.

America Follows Trends in Europe and Asia

In Europe and Asia, 1/8 scale off-road gas racing is hot. The size of 1/8 scale both in terms of the machine and the track allows for greater realism and increased excitement. There is a heft to the machine that means serious business. Seven and one-half pounds of highly engineered components are propelled down the straights at speeds from 40 to 50 actual mph.

What R/C enthusiasts in Europe and Asia have found out is that driving 1/8 scale gas cars brings them closer to the real thing. The sound of the engines, the horsepower, the speed, the appearance and even the smell of nitro creates a rush of excitement that Americans can relate to and race to.

For drivers of 1/8 scale gas who come from the 1/10 scale electric ranks it's a chance to test their mechanical and driving skills with a machine that's faster, heavier and moves like a pit bull on a mission.

New Event for Track Owners

The Kyosho 1/8 Scale Off-Road Challenge race series will be taking place all across the country. At chosen tracks, these sponsored race events will be given extensive publicity.

From these track locations, Kyosho expects the speed, the excitement, and the absolute fun of 1/8 scale gas to spread to selected R/C tracks all over America.

With 1/8 scale gas off-road a track owner is offered a new form of racing. One that turns up the volume and with speeds that can be best described as "ballistic." Spectators love the action and 1/8 scale runs a shiver up the back of R/C car hobbyists looking for a greater thrill.

Almost any good sized off-road track will accommodate 1/8 scale cars. Ideally, the

straights should be at least 100 ft. long and the lanes should be 6 to 8 ft. wide. Smaller tracks can simply run fewer cars per heat. An advantage of 1/8 off-road is that minimal track maintenance is necessary. These cars can tackle virtually any type of surface, no matter how rough.

Racers and spectators get more than just a few brief moments of action with 1/8 scale. In gas off-road, qualifiers are usually in the 5 to 10 minute range with mains lasting between 30 minutes and one hour. Pit stops for fuel are required during the main event.

A Proven Track Record

Kyosho is ideally suited to champion the 1/8 scale gas movement in America. As a leading manufacturer of electric R/C race cars and monster trucks, Kyosho has developed the technology that recognizes the demands of racing at 40 to 50 mph speeds on terrain that can be smooth, rough or anywhere in between.

Kyosho's Burns DX and Turbo Burns 1/8 scale off-road cars are classic examples of designs that match the demands of the racing category. The result is a combination of years of experience with R/C cars and advanced engineering. Unique suspension systems, .21 buggy engines and chassis configurations work together to allow maximum speed with optimum control.

The Kyosho Burns series is an out front 1/8 scale competitive choice and was raced to 2nd Place in the 1988 IFMAR World Championships.

Three Cars in One

All types of people are drawn to 1/8 scale gas cars. While 1/8 scale gas is ideal for dirt off-road racing, the opportunity for other forms of racing is clearly there. Some prefer dirt off-road courses while others lower the suspension, add an 1/8 scale ASA body and tear into some exciting dirt oval action. The addition of a set of slicks puts a 1/8 scale gas car on the asphalt for oval racing.

The versatility of 1/8 scale gives the owner an investment of three cars in one.

1/8 Scale Started It All

1/8 scale gas on-road racing is really the roots of R/C car racing as we know it today. In the 1970s, on-road gas was where it all began. Equipment was crude in those days and reliability was a major stumbling block to early 1/8 races. Electric racing came into being and is almost totally responsible for the explosion of interest in R/C cars of all scales, both gas and electric.

Today, with advances in technology of engines, radios and chassis, the 1/8 scale gas off-road category is a form of racing to be easily enjoyed by any R/C car enthusiast. Kyosho pledges to provide the push needed to raise the awareness of 1/8 scale racing and to rally the R/C racers who wish to share their interest in this high-speed racing class. The "Kyosho 1/8 Scale Off-Road Challenge" race series is only the beginning!

You Can Become Involved

Kyosho is serious about getting 1/8 off-road up to speed in America. If you, your club or track are interested in a ground floor opportunity to get involved in helping to promote this new, exciting category, call Bill Jeric or Tom Grogg at Kyosho (217) 398-3630 or write c/o Kyosho, P.O. Box 543, Champaign, IL 61824-0543.

Kyosho 1/8 Scale Off-Road Challenge Race Schedule 1990

March 23, 24 & 25
ARCAR Raceway,
Atlanta, GA

(More Dates To Be Announced)

INSIDE SCOOP

by RICH HEMSTREET

The R/C car industry is rapidly advancing, with new products being offered at a head-spinning rate. So, I'll make manufacturers nervous, but feed you R/C squirrels who are hungry for info, by bringing you a special report on security leaks and "late-in" items. Here goes!



CLOD CHALLENGER

Kyosho is back with a vengeance to challenge the Clod Buster; its exclusive new USA-1 monster truck will soon be available. This 4WD, 4WS, twin-motor truck features an all-new suspension system plus Clod-size wheels and tires. Of course, a 1990



Chevy Silverado body will be standard on the USA-1. Watch for more information!

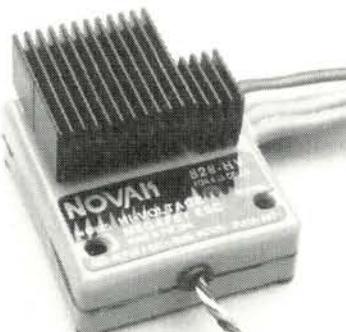
SPEEDWORKS ROAD RACE

The third, and final, round of the Speedworks Sportsman Cup Race will be held on the new Ranch Pit Shop road-course. This race will be for amateur drivers only, and a

group of top invitational drivers will run in an exhibition class and hold seminars. Look for this on October 5, 6 and 7 in Pomona, CA.

NEVER ENOUGH

Novak has a solution for those of you who can never get enough power to the road. Its new 828-HV (High-Voltage) Megafet ESC is designed for 8 to 28 cells, *only!* This high-powered monster won't work with fewer than 8 cells, so don't plan to use this one for anything except drag racing, truck pulling, or land-speed record attempts! The 828-HV was the winning



speed control in the Top Fuel Class at the IEDA Winternationals.



REALLY HEAVY METAL

A full-scale monster tank on the U.S. Hot Rod Association Truck Racing circuit carries a familiar logo: on the door panel, right above the tank's heavy-metal name, there's a Kyosho sticker. The tank is based on an M-45 per-

sonnel-carrier chassis, and it carries a 1951 Ford F-100 pickup body. The big-block, alcohol-burning Chevy pumps out 800hp, and this 23,000-pound tank can reach speeds of 50mph.

JG'S AT IT ALREADY!

Tamiya's hot new King Cab is already revving up after-market suppliers. Word has it that JG Mfg. is about to release some goodies for the King Cab. They'll offer a set of direct bolt-on rear rims that will extend the rear width by a full inch. Two new front bumpers will soon be available, too. They can be bolted directly to the chassis and offer improved front-end protection. One will be wider than stock, and the other will be even wider.



1/12-SCALE WORLDS

Trinity will join the Kebun Baru Radio-Control Auto Club to sponsor the 1990 IFMAR 1/12-scale World Championships in Singapore. Featuring the best 1/12-scale racers in the world, the event is scheduled to take place from July 29 through August 4, 1990, and it will be for 6-cell cars on carpet.

BIG, BIG, BIG BOSS

Kyosho's Big Boss is going full scale with a 429-cubic-inch supercharged Ford V-8 engine that produces over 800 horsepower. This tubular-frame monster truck will carry a fiberglass '86 Ford F-250 body that will be painted to match the 1/10-scale Kyosho truck. This summer, the full-

scale Big Boss will compete at more than 50 monster-truck racing events around the country. Kyosho is doing this to lead the way in bringing the excitement of R/C to a previously untapped audience. Watch *Car Action* for further details.

McCoy IS BACK!

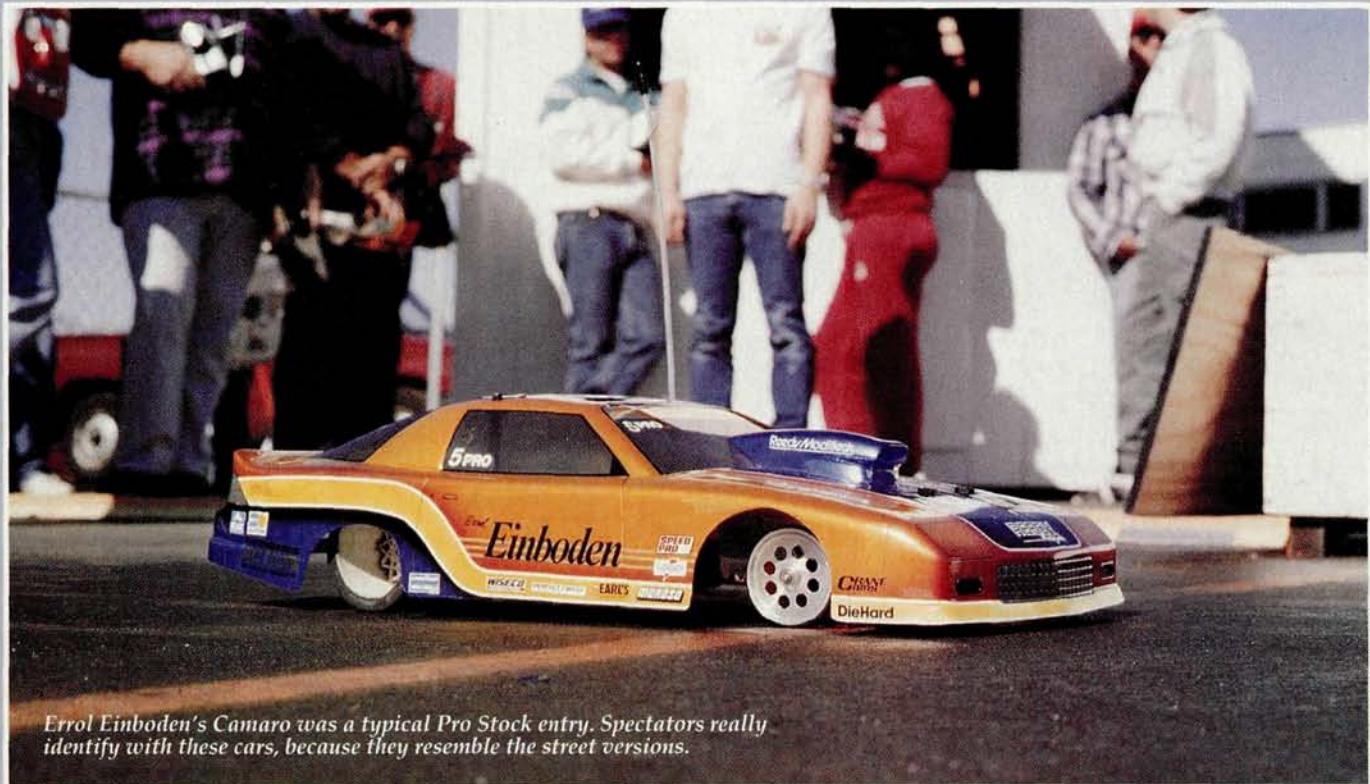
The 18th Annual McCoy race is on! Plans call for the McCoy/West Coast Engines Transition race to be held at Cajon R/C Speedway in El Cajon, CA. Practice is

scheduled for June 4 through 7, and Qualifying and Mains will take place on June 8 and 9. For more information, contact Norman Sullivan (619) 449-0788.

INTERNATIONAL ELECTRIC D R A G A S S O C I A T I O N

IEDA winternationals

by RICK HOULE



Errol Einboden's Camaro was a typical Pro Stock entry. Spectators really identify with these cars, because they resemble the street versions.

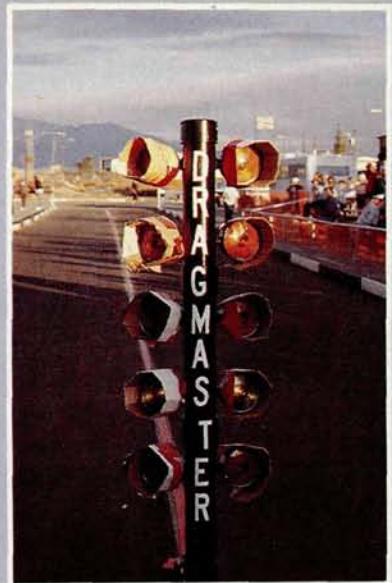
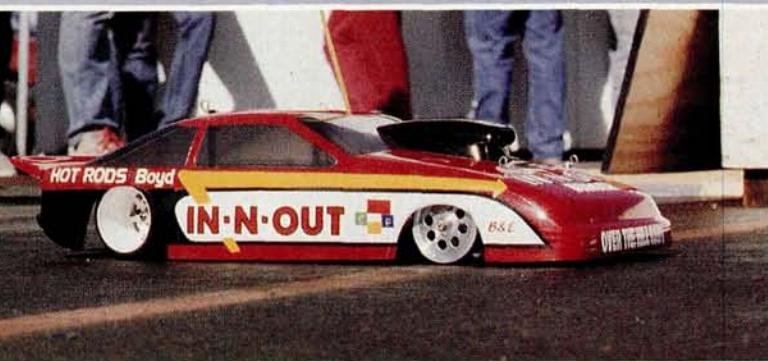
AS WESTERN-CLAD GUNSLINGERS staged mock fights on the main street of nearby Movie-land Frontier Town, East met West in a shoot-out on the blacktop of Bob & Jim's Drag World. Electric motors were the guns and Ni-Cd cells the bullets at the IEDA Winternationals, as R/C drag racing's top guns squared off in quick-draw eliminations that saw records fall and cars wrecked beyond repair. Then, there were the big guns—motors so large that they barely fit within the parameters of the IEDA rules: a motor can be no larger than 2 $\frac{1}{2}$ by 3 $\frac{1}{2}$ inches.



Team Losi's Top Alcohol Dragster—Revolution—was piloted by Chris Gilbert. This sharp rail won 3rd place in Concours.

HOGLUE GUNS 'EM DOWN

Vern Tripp had three matching In-N-Out Burger cars; this was his Pro Stock entry.



Drag World has run races every Sunday since August '89. At that time, R/C drag racing was becoming so popular in Southern California that the operation had to be moved from the Riverside Community College parking lot to its present site. Touted as the West Coast's first "full-time" R/C drag strip, the facility is professionally laid out with bleachers, a staging area and a two-story control tower/radio impound. Foam crash barriers at the far end of the 132-foot strip (a $\frac{1}{10}$ -scale quarter-mile) prevent runaway cars from ending up in San Bernardino in a million pieces! The facility's Christmas-tree-light starting system couldn't be programmed for Bracket racing, so Fine Design brought its Drag Master from New York.

VHT (Very High Traction), the substance used by full-size dragsters to make a track sticky for the best traction, was also used at Drag World to get the cars to hook-up. East Coast racers, who are more familiar with tracks coated with sugar water, found that VHT was a little too sticky, and it prevented the low ETs they had expected from their cars.

as low as 1.80 seconds (with speeds up to 74mph) at the Family Hobby Centers track in Naples, FL, but he only managed ETs of 2.45



during practice runs at Drag World on the Thursday before the Winternats. That was to change considerably, however, by the time Sunday rolled around.

Some of the major players from the East Coast were the Fine Design Firefox team from New York and the Houge Enterprises contin-

Local hot-shoe Robby Popp (of D&E Racing Wheels) fielded this flame-painted '49 Merc. His Pro Comp car finished 5th.



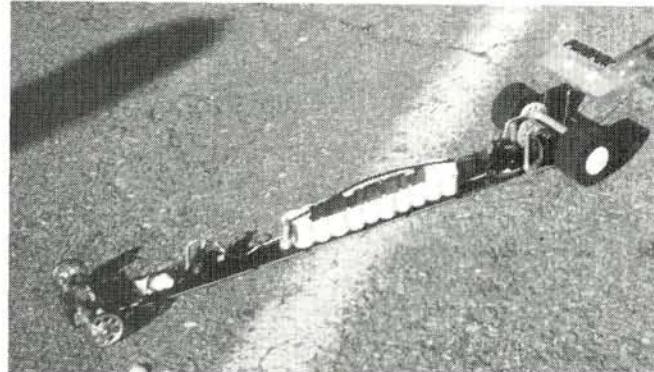
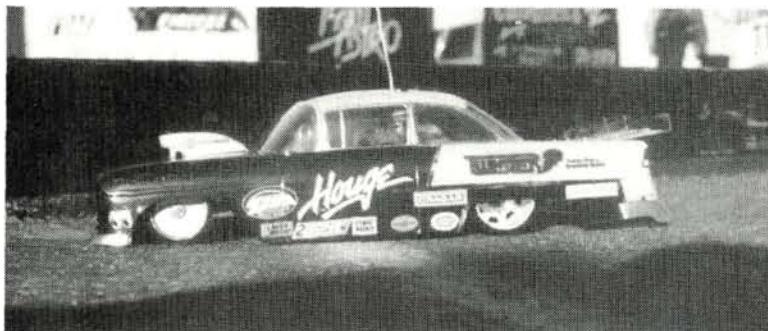
Jeff Renney piloted this Twister-powered Oldsmobile Cutlass in Pro Stock. With no writing, it had the "privateer" look.

As Mike Houge of Houge Enterprises explained, "Your ET is pretty much decided off the starting line. Obviously, if you shoot off the line like a bullet, you'll turn in a quicker ET than if it takes 8 feet for your car to get out of all the stickiness." Houge claims to have posted ETs

gent from Florida. The more predominant West Coast competitors included Team Astro and Team Twister, both based in California. Although the turnout of local racers was a little disappointing, those who did come showed their stuff with very successful results.

IEDA WINTERNATIONALS

Bob Harris's Firefox Top Fuel Dragster made it to the second round. Twenty cells take up most of the chassis!



MAJOR MOTORS

Like most major events, the Winternationals had some controversy. Rumors circulated that, during practice, the Easterners were using "giant" motors the "size of beer cans" to post ETs below the 2-second barrier!

The fact is that Fine Design brought a long, black motor called the Firefox Big One. (This German-made motor is better known by drag boat enthusiasts as the Graupner 900 and 800 Series Cobalt motor.) On Sunday, Chris Fine of Fine Design set a world record ET of 1.85 seconds in round one of qualifying, but he was disqualified for not returning what was left of his Top Fuel Dragster to the tech inspection table after a bad crash at the end of his run. Fine's teammate, Jamie Colon, vindicated his fallen partner by going on to claim Low ET of the meet (1.82), Top Speed (70.29mph) and National ET

- *The fastest Pro Comp entry was driven by Ken Hively. This hot '57 Chevy was Twister-powered.*

Ron Paris (left), world famous for his Paris 1/8-scale gas engines, tried his hand at electric drag racing. He was outgunned by Phil Simms in Top Fuel action.



Record (1.865)—all with a Firefox Big One!

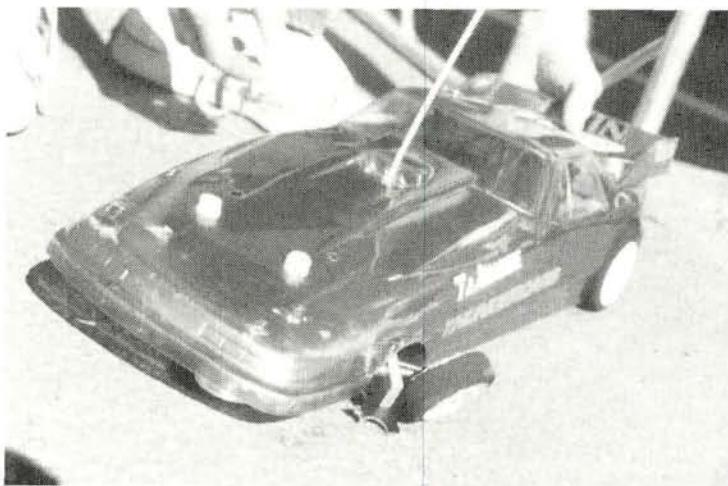
To counter this threat, Bob Boucher (owner of Team Astro) pulled out his own heavy artillery—an Astro Top Fuel II Cobalt motor, a 6-turn powerplant that seemed to take up every

- *Chris Fine stages his Fine Design funny car at the line. He picked up the transmitter and won the Top Fuel Funny Car Class!*

bit of the 2 $\frac{1}{2}$ x 3 $\frac{1}{2}$ -inch size limit. (Presently, the Team Astro and Graupner motors are the only cobalt magnet motors allowed under IEDA rules.)

Cobalt magnets are "rare earth magnets made from exotic materials, and they're very expensive," explained Mike Walker of Twister Motors. These motors are illegal in ROAR- and NORRCA-sanctioned races, presumably because of their prohibitive costs. The world of drag racing, however, is more of a run-what-you-brung deal.

With costs ranging from \$160 wholesale to \$300 retail, the Graupner is definitely not for the budget racer! Chris Fine is quick to point out that this isn't a problem, though, because his motors last a long time and are maintenance-free. The one he used to break the world ET record was six months old and still had the original brushes! Before you think that you'll have to spend all your paper-route money for the next three years just to compete with this new generation of high-voltage motors, remember that they're extremely power-hungry. They need



tons of electricity to perform well; anything less than 18 Ni-Cd cells simply isn't enough. Under IEDA rules, Top Fuel Dragster is the only class that allows that many batteries.

Hoping for a better chance against the Graupner in the Top Fuel Dragster class, Mike Houge, who normally uses CAM motors, switched to the Astro Top Fuel II late in the game. He and his crew worked into the wee hours of Sunday morning before they began to see satisfactory results. The powerplant gamble worked, and Houge went on to become Top Fuel Dragster Winternational Champion!

Twister Motor's Erik Soderquist was on hand with the company's new miniature Pocket Comm Lathe to keep team drivers like Ken Hively, Terrence Holt and Ned Morris in top-running condition. Even with all the 20-cell-pushed big-bore motors around, Holt's ET time of 2.10 was the 12th

• *Steve Kennicott's Alcohol Funny Car suffered a severe crash in the first round. It truly was eliminated!*

quickest overall, and that's with only 8 cells and a more conventional ferrite magnet motor! (CAM motors also made a very healthy showing at the hands of the highly motivated Houge group.)



• *This shot shows the layout of Drag World. The 1/10-scale quarter-mile is the center of attention, and pit space surrounds the track.*

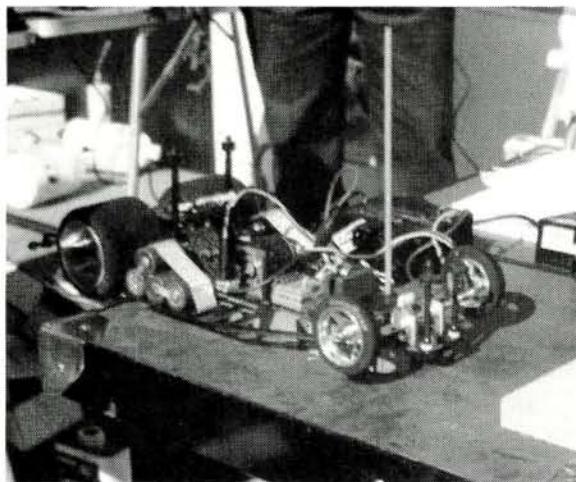


• *Mike Houge holds his Houge Illusion dragster. He won the Top Fuel Dragster Class, using a Team Astro motor.*

AMP CONTROL

There were some interesting speed-control innovations. Novak Electronics' new 828-HV (High Voltage), which handles 8 to 28 cells, was seen on many of the top cars, particularly in the Top Fuel and Top Alcohol Rails. Other electronic SCs spotted among the top guns included PDI, Tekin and Titan. A few clever racers, however, caused debate when they broke with tradition and eliminated the electronic SC all together!

To connect the power of 20 cells to a thirsty Graupner, Chris Fine mounted a simple microswitch onto a Futaba servo (Firefox Speed One). With this "instant-on" setup, the Firefox boys felt they had a slight edge over the more conventional SC-equipped cars, because, at the start, they bypass the time it takes for the amperage to come up through the circuitry. This time lapse must be measured in milliseconds: these guys were cutting it that close in Colton!



Although this system worked for quick runs, the contact sometimes welded shut and the cars continued at full speed into the crash barrier!

Top Eliminator in the Bracket Cars, Stan Wagner, also broke with tradition: to connect the 6 cells of his EconoRail Dragster to a stock motor, he used a simple resistor with a wiper mounted on a servo.

"SLAMMING"

When it comes to bodies, drag racers are very creative. Kelvin Grant of Team Astro took top honors in Concours with a beautiful, sleek

- Frank Killams' Pro
- Comp racer is modeled
- after full-scale racers.
- Pro Comp cars must
- have body styles that
- are at least five years
- old, and they can use
- up to 14 cells.
- ...
- ...

BRACKET

Name	Chassis	Motor
1 Stan Wagner	Scratch-built	Reedy
2 Mike Rachwitz	Houge Illusion	Twister
3 Bill Brier	Pro Comp	Twister

PRO COMP

1 Ken Hively	Houge Phantom	Twister
2 Jill Simms	Houge Phantom	CAM
3 Jamie Colon	F/D Firefox Pro Stock	Team Astro

PRO STOCK

1 Terrence Holt	Modified Agitator	Twister
2 Ned Morris	Scratch-built	Twister
3 Phil Simms	Houge Phantom	CAM

ALCOHOL FUNNY CAR

1 Gary Reeter	Scratch-built	Team Astro
2 Mike Myhre	n/a	n/a
3 Jim Schauer	Houge	Revolution

TOP FUEL FUNNY CAR

1 Chris Fine	Fine Design Firefox	Graupner
2 Vern Tripp	Scratch-built	Team Astro
3 Dennis Hill	Houge Illusion	Twister

TOP ALCOHOL DRAGSTER

1 Jill Simms	Houge Illusion	CAM
2 Don Monsko	Houge Illusion	CAM
3 Tom Beville	Houge Illusion	Team Astro

TOP FUEL DRAGSTER

1 Mike Houge	Houge Illusion	Team Astro
2 Jamie Colon	Fine Design Firefox	Graupner
3 Phil Simms	Houge Illusion	Team Astro

Funny Car. Jon Wagner took 2nd place with another Funny Car, and Jim Schauer of Team Losi took 3rd with his Alcohol Dragster. Another Team Astro driver, Jimmy Valentine, had a Pro Comp car sporting a Parma ZZ-Top and a "Rad Cad" body complete with chrome side pipes! Robby Popp of D&E Racing Wheels had a '49 Merc with flames.

By fully "slamming" their cars, several drivers tested the rules that govern body trimming. IEDA rules allow you to trim the body above the bottom trim lines molded-in by the manufacturer, but they don't specify by how much. Pro Stock runner-up Ned Morris's fully "slammed" Ford Probe body (from Premier Designs) was trimmed at the very top of the front and rear bumpers, and the clearance between the front wheels and the fenders had to be measured with a pocket knife! (This area of the rule-book may need to be reworked!)

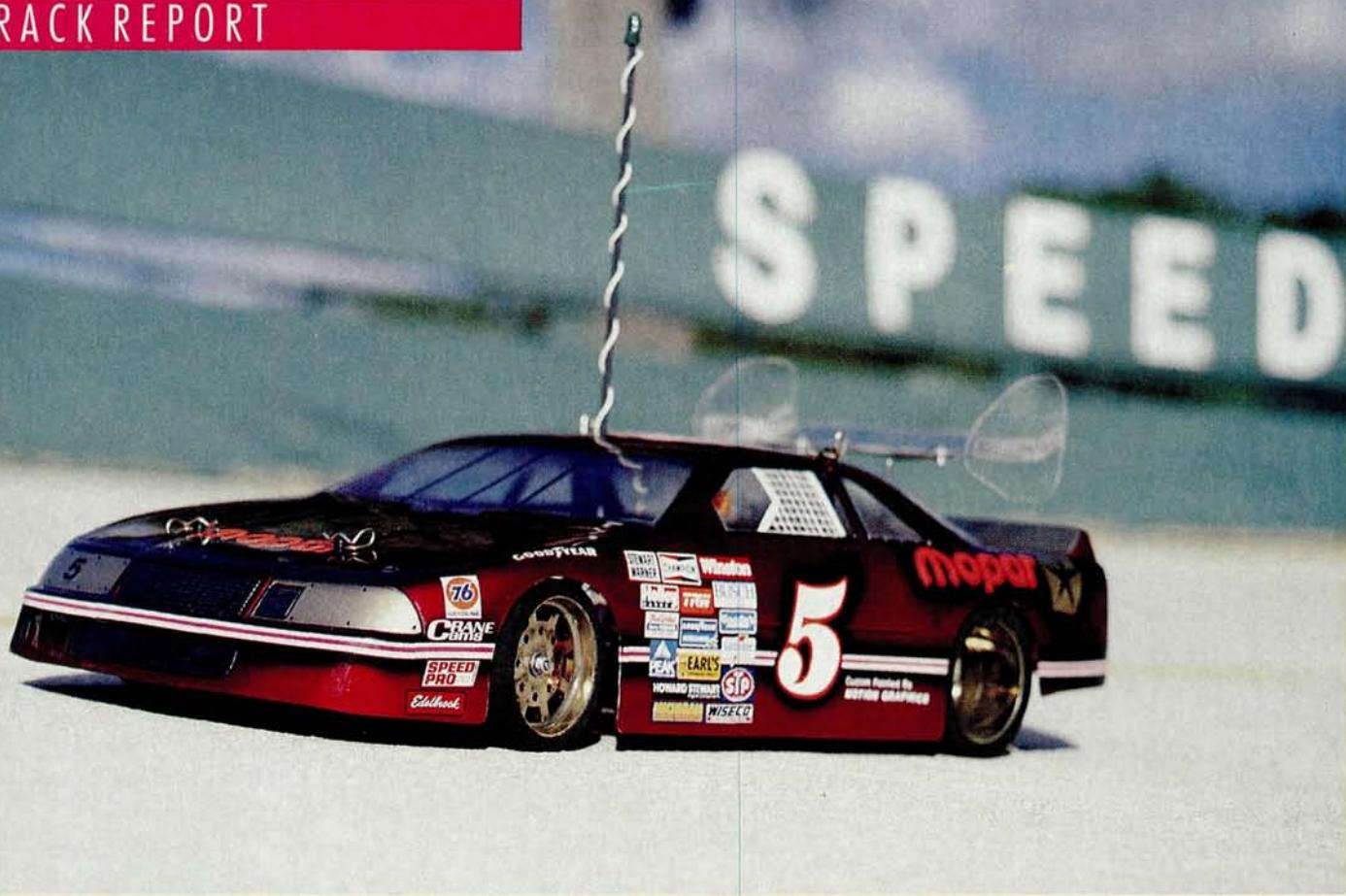
One of the more interesting cars at the meet was Frank Killiam's Pro Stock '67 Nova II. The chassis was a well-engineered marriage of form and function. Killiam and fellow racer Tom Bowlin joined forces to build this R/C dragster using full-size specs from Allston's Chassis Guide. (Allston builds full-size rails.) Details, such as the wheely bars and the wheels, were from Lazer Lite, and the car was powered by a Checkpoint motor.

One interesting aspect of R/C drag racing is that you get to see man and machine at the starting line preparing to go head-to-head with another car and driver. The combat pistol-type stance many drivers have adopted with their transmitters added to the shoot-out spirit of the event!

FINAL ELIMINATIONS

Eighty-six drivers qualified on Saturday—a healthy draw considering that the Reedy Race of Champions and NOR R C A Mickey Thompson events were held the same weekend. By Sunday, all the cars were dialed-in to the max, because in a drag-racing final, there are no second chances. It's a do-or-die situation, and every component has to be at its best. Every driver's concentration is at its peak, and each trigger finger's reaction time is tested to the fullest! Cut a light too quickly, and you risk staring at the big red light, which signals your disqualification. Move too slowly, and you look as if you're asleep at the controls while your opponent's car rockets down the strip for the win! The name of the game is consistency, coupled with the best power/weight ratio.

(Continued on page 117)



URING THE EARLY days of 1/12-scale racing when Mabuchi motors and lead-acid batteries were king, who would have thought that R/C on-road racing would snowball to today's proportions? Along with this huge jump in its popularity have come tremendous improvements in technology, which is pushing these cars to ever-increasing speeds.

BOLINK **ELIMINATOR GOLD**

by STEVE POND

THE GOLD STANDARD



Consider that during the Western half of *Car Action's* East/West Shootout, the 1/10-scale on-road cars exceeded 60mph! Also remember that, at this speed, the 7 3/4-inch-circumference tires approach 135 revolutions a second! Some aspects of on-road racing have developed into high-tech, high-performance events (the result of constant product testing and updating), and that brings me to the subject of this report.

To keep up with all this high-tech development, Bolink* (one of the most established R/C racing manufacturers) has improved its Eliminator and introduced its latest 1/10-scale on-road racer—the Gold Edition. Based on the design of the Eliminator, this new version has a few factory updates. Why "Gold Edition"? Almost all its metal parts have been gold anodized—everything from axle mounts to wing buttons. The car looks classy, even before the body has been mounted.

GOING FOR GOLD

The basic features include a graphite-plate chassis, a coil-sprung kingpin suspension

nally designed to modify the standard Eliminator 10. These include an upper kingpin support on the front end to help prevent uneven tire wear; a pivot ball on the rear of the T-plate to promote smoother, less restrictive side-to-side movement; ride-height adjusters; low-profile Bolink Fasttrack tires; and an additional dampener that's simple and light to slow chassis roll when cornering.

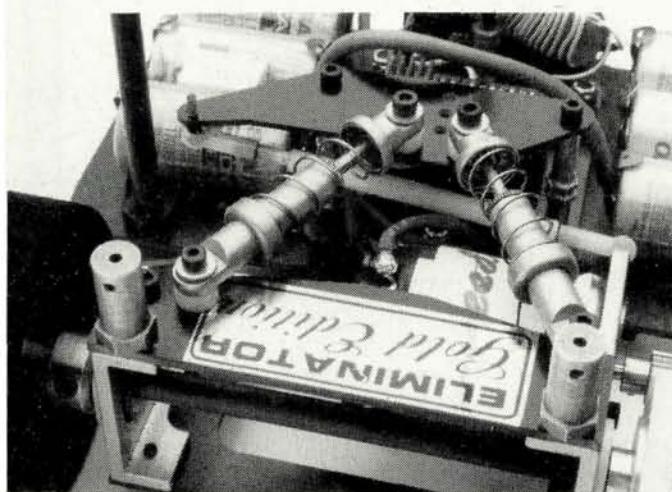
ASSEMBLY

Despite the Gold Edition's fast-track breeding, its design makes it easy to assemble. I'd like to be able to offer some words of wisdom where the instructions

tail, and there are also some helpful racing and maintenance tips.

It should take you only a few hours to finish the complete chassis, and when the body has been painted and mounted, you only have to install the accessories of your choice. As far as the body goes, I've been known to lay down some pretty nice paint jobs, but I don't consider this my forte; in fact, painting is the assembly task I like least. Armed with Bolink's new Chrysler LeBaron stock-car body (the Gold comes with a stock-car body, but you don't know which one until you open the kit), I didn't think this car would be complete without the Midas touch of Motion Graphics*.

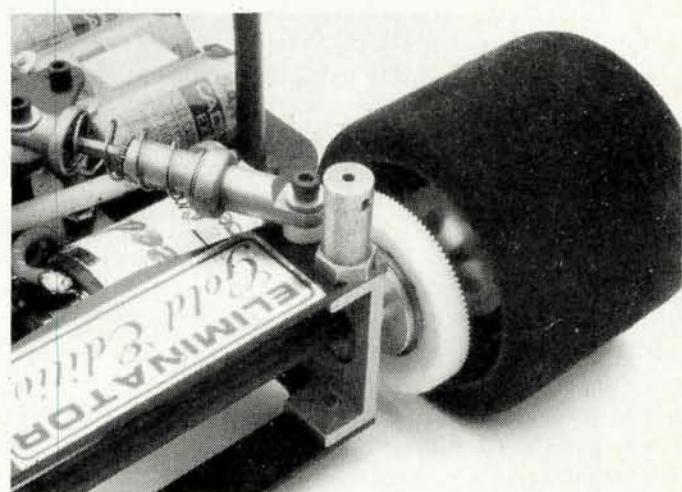
Having been given no more direction than a request that it look something like a stock car, Rich Muise waved his air-powered wand over the body and the result, as usual, is great. The body's main color is a candy-apple red, and there are white, gold and fluorescent orange ac-



In addition to the two shocks on the Eliminator Gold, there's also a simple roll dampener, which connects one side of the pod to the opposite side of the shock tower.

in the front and T-plate suspension in the rear, aluminum-pod sides, a pro diff and a unique graphite-plate front axle.

It also has extra features that were origi-



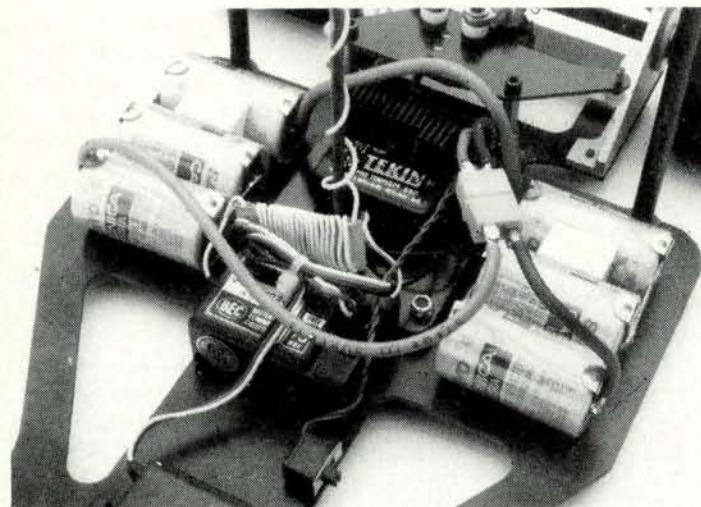
The Speedworks Joel Johnson motor put the power to the ground via Robinson Racing's 64-pitch Titanium Gold pinions and precision-machined spurs.

may have left out a thing or two, but no such luck! Even though the car's simple design doesn't require very explicit instructions, everything is discussed in de-

cents. A picture can't do this lacquer job justice; just take my word that it's a top-notch job.

ACCESSORIES

I spent some time choosing suitable accessories for the class in which I'd be racing, and I also kept my local track in mind. I spend a lot of time doing tests at a track that has a flat oval and a roadcourse on which there's usually some exciting stock-class competition. I planned to compete in stock, so I picked accessories



The Magic Motorsports matched 1700 pack and the Tekin ESC 300 Pro Tempfet speed controller made a reasonably priced power package that performed flawlessly.

that wouldn't compromise performance—or cost an arm and a leg.

The Trinity* Speedworks Joel Johnson Signature motor is quickly earning a reputation as one of the fastest stock motors, so it seemed a good choice for the Gold. I also used another product endorsed by the "Magic Man"—I picked up a few sets of Magic Motorsports* matched, assembled packs. These packs are available in just about any configuration, but the Gold has only three battery slots on each side of its chassis, so this choice was a rather easy one.

To bridge the gap between the battery and the motor, there's a Tekin* ESC 300 Pro Tempfet electronic speed controller. The 300 is Tekin's least expensive controller, but its performance is more than adequate for stock class and mild modified racing. It's one of the lightest, most compact ESCs on the market, and it's more than capable of handling the stock motor, while enabling you to save a little weight and money, too. With a Futaba* Magnum Jr. R/C system (my favorite)

using an FP-S132H servo, the Gold was a race-ready package—almost.

Although the Gold comes with its own spur gear, which I'm sure works well, I swapped it for a Robinson Racing* precision-machined, 64-pitch spur gear. I think these are some of the finest gears available, and after contacting Robinson Racing, I had some brand-new pinions to run as well. It seemed appropriate to use these new pinions on the Gold, because they have the designation "Pure Gold." These gears have the same machined stainless-steel base with the addition of a titanium-nitride plating.

According to Robinson Racing, this plating's incredible surface hardness does a great deal to decrease friction—to the tune of about 40

percent! Because these gears were fresh off the production line, I could only get a few of them in the larger sizes, but it just so happened that one of the pinions combined with the 100-tooth spur gave me a good ratio with which to start at the first test site—Lake Whippoorwill Speedway, in Florida.

PERFORMANCE

To test-pilot the car while I caught it on film, I had the services of the honorable "Sir" Bill Horne, who has been around the Speedway for so long that the restroom building is named in his honor! That Saturday, Bill was at the track all day, competing at the weekly races. He was doing very well, but he wanted to break the track record of 41 laps. Taking time out between the heats and the Mains, Bill gave the Gold's battery packs a strong peak and we headed for the track.

To preserve the beautiful Motion Graphics body, the tail section wasn't cut out (a taboo at this track), but for its first

(Continued on page 127)

ELIMINATOR GOLD EDITION

Type On-road
Scale 1/10
Sug. Retail Price \$325

DIMENSIONS:

Overall Length 17.25 inches
Width 8.75 inches
Height 4.5 inches
Wheelbase 10.25 inches
Front Track 7.38 inches
Rear Track 6.75 inches

WEIGHT:

Gross (w/bat.) 42 ounces

BODY:

Type Stock car
Material Polycarbonate

CHASSIS:

Type Flat pan
Material Graphite

DRIVE TRAIN:

Primary Pinion/spur
Transmission Direct drive
Differential Ball diff
Bearings Ball bearings

SUSPENSION:

Front: Type Graphite plate
Dampening Coil-spring
Rear: Type T-plate
Dampening Aluminum, oil-filled, coil-over shocks

WHEELS:

Front: Type One-piece plastic
Dimensions (DxW) 1.8x1.125 inches
Rear: Type One-piece plastic
Dimensions (DxW) 1.8x1.5 inches

TIRES:

Front/Rear Bolink Fasttrack green foam

ELECTRICS:

Motor 05/540*
Battery 6-cell pack*
Speed Controller Electronic*

OPTIONS AS TESTED:

Tekin ECS 300 Pro Tempfet Speed controller; Speedworks Joel Johnson stock motor; Futaba Magnum Jr. radio; Robinson Racing precision-machined spur gears and Titanium Gold pinions; Bad Dawg diff balls.

COMMENTS:

The Eliminator Gold can be a real force in on-road racing. The front end is adjustable, which helps tune the car to most tracks, but it has very limited adjustment range, and this hampers further tuning. Out of the box, the car tends to push and to cone tires, even with the upper kingpin support. The Gold edition is an improvement over the standard Eliminator, and with a little tinkering, it can be very competitive.

* not included

COMING NEXT MONTH!

CAR ACTION'S

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CAR OF THE YEAR



RACE COVERAGE

K&N Winter Blast

G R Winter Champs

NEW FEATURE

Home-Built Projects

TRACK REPORTS



Kyosho Turbo Raider
Tamiya Mad Cap

COLUMNS

Truck Stop
Dirt Digest

TROUBLESHOOTING

Welcome to "Troubleshooting"! If you're having a problem that your hobby shop or racing friends can't resolve, give us a shout at Car Action, and we'll see if we can chase down an answer for you. Questions should be of a technical nature and should be addressed to: Troubleshooting, c/o Radio Control Car Action, 251 Danbury Rd., Wilton, CT 06897.



TERRA TIRE TROUBLES

I own a Tamiya Blackfoot. How do you mount Big Bear wheels and tires on the truck? Do you have to use adapters?

At the rear of my Blackfoot, I've bolted a complete Thorp gear system to the chassis. When I bought my gear kit, the long shafts had no holes for the pin to pass through; instead, they came with part no. 4512, which is an aluminum hub that has a screw with which to tighten it around the axle.

To mount the Big Bear wheels onto the rear axles, do you take off the original plastic hubs and put on new hubs, or will adapters fit over the plastic hubs that are already on the axle?

There's no way I could replace the hub with an adapter. Would I have to send back my axles and new aluminum hubs to get new axles with holes through them?

Shawn Weeks,
Windham, ME

Originally, the Thorp axles that were designed for the Blackfoot did have holes drilled through them to accommodate the pin that holds the wheel hubs in place, but drilling these holes weakened the axles so much that they broke when heavily stressed.

The latest Thorp axles for the Blackfoot (which you have) use a bolt-on hub that

doesn't require holes in the axle. This design is more rigid and less likely to break.

To answer your other question: I know of no way to attach the Marui tires and wheels to the new Thorp axles. The available adapters require that the original hubs be removed, so allowing the pin for the adapter to slide over. Because the new Thorp axles are solid and don't require a pin, the adapters won't fit. The people at Thorp say that the axles with holes are still available, but they don't recommend them because of problems with breaking. Many truck owners still want to use them, though.



SC WHAT?

How many turns should a modified motor have for an RC10 if it's really set up and the driver is good?

At my hobby shop, they have some SCK batteries (that "K" is no mistake!) that they say have a higher voltage (like SCRs) and longer run times (like SCEs). They can also be fast-charged like regular SCs. Have you heard of these batteries and, if so, could you give me a little more information about them?

Jeff Le Bel.
Ft. Worth, TX

by STEVE POND

To answer the first question: when you're choosing a motor, consider the track on which you race. Without this information, it's difficult for us even to take a guess, but we've found that the 15- or 16-turn doubles and triples are good starting points.

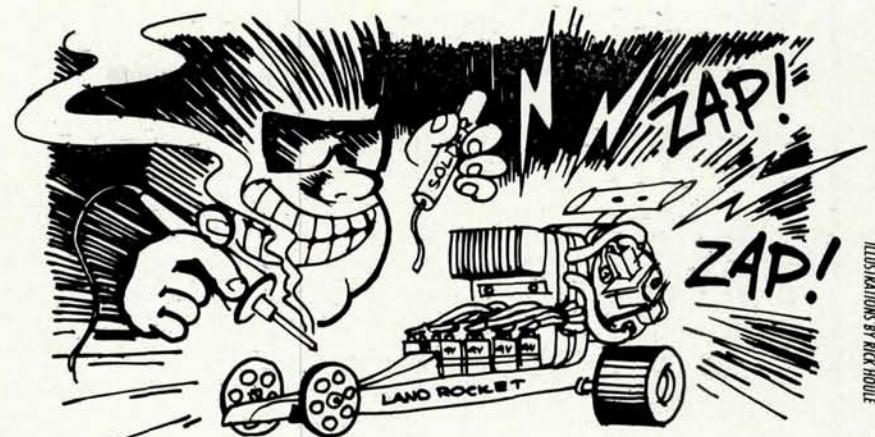
As for the new SCK cells, they're from Sanyo, and they're more resistant to damage when being operated at higher temperatures. Comparable to Sanyo's SC and SCR cells, the SCKs are 23mm in diameter, 43mm long and weigh 52 grams (the same as an SCR and 1 gram lighter than the SCE cell).

The internal resistance of the SCK cell is 4.2 milliohms (SCR, 4.0 milliohms; SCE, 5.5 milliohms). Compared with the SCR, the SCK has a higher internal resistance, which will mean a slightly lower voltage output, but a slightly longer run time. Initial test results on the SCKs from a variety of sources show no performance advantage over the SCR—it's closest relative; but in the long run, the SCK's construction should prolong the cell's life and so give a more consistent performance.

With the way we R/C racers use Ni-Cd cells, they're bound to get very hot because of the high charge and discharge rates. Since the SCK can tolerate heat better, common sense says it should be a better cell for us. Initial response on its performance has, however, been mixed, and until we get more track time with these cells, we can't make an accurate comparison.

HIGH VOLTAGE

Can you help me with a scratch-built project I'm working on? I'm designing an electric drag rail, and I want to wire together a pack of ten 9V batteries, since they'd be light and compact. I need a speed controller that's suitable for a high voltage, and I also need a motor that can take a short burst of high power without leaving its own smoke trail. Do you have any ideas about which motor I should use



(besides gas)? It should be able to take at least 90 volts. How about a speed controller that can handle this without suffering a complete meltdown?

Scott Gordon,
Two Rivers, WI

I'll come right to the point: your suggestion is virtually impossible! Assuming you're referring to 9V alkaline cells when you say you want to solder together a pack of 9V batteries, using these cells spells certain disaster. The internal resistance of an alkaline battery is substantially higher than that of the Ni-Cds, and this high resistance limits the amount of available current. Using them in R/C drag racing—where current demands are in the region of 100 amps—would produce the same effect as shorting the battery with a screwdriver.

Even if you did find a source of power that would supply 90 volts at roughly 100 amps, no available speed controller could handle that much electricity. Few available electronic speed controllers are capable of handling more than 20 volts—never mind 90! Some Mosfets could handle that kind of voltage, but their inefficient construction allows tremendous voltage loss when compared with the Mosfets used in our speed controllers.

Let's take it one step further: say that you found a useable power supply and a speed controller that could handle these loads; you'd still have to find a motor. The 05- or 540-type motors used in electric R/C racing have a difficult time handling 20 volts; in fact, at this voltage level, the life of a motor would probably be about 60 seconds—give or take a few seconds! At 90 volts, you could expect the motor to run for about a quarter of a second! Still interested?!

With currently available technology, what you're proposing isn't possible. Stick with those heavy old Ni-Cd batteries and R/C motors, but look at the small 600mAh batteries used by top racers—even if they can only move your car at 70mph (and more!) on the drag strip!



NO U-TURN

My RC10 has a steering problem. I've only been in the hobby for about seven months, so I don't know how to fix my car's steering. The wheels only turn about 12 degrees in both directions. There may not be a problem, but I'd like your opinion. Any help would be appreciated.

Sean Dowling,
Old Greenwich, CT

A number of factors could be contributing to your RC10's steering problem, and I'll just go through a process of elimination:

First, check to see that the radio isn't the cause of your problem. Many radio systems have a dual-rate adjustment on the grip part of the radio (assuming you have a pistol-grip transmitter). The dual-rate adjustment is used to limit the amount

CONTRIBUTORS WANTED

We think many of our readers have ideas that are worth sharing. How many times have you read an article and said, "I could do that!" or "That's not the only way to do that; my way is easier!" Could be!

Here's your chance. We're expanding **Radio Control Car Action** and are looking for additional contributors to help us accomplish this objective. Of key importance are good photographs; the writing we can help you with. Interested? It's much easier than you might think!

Let's hear from you. Send in your article ideas and a few sample photographs. We're looking forward to seeing them.

Rich Hemstreet
R/C Car Action
Air Age Publishing
251 Danbury Road
Wilton, CT 06897

EDITORIAL OPPORTUNITY

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Wilton, CT 06897

TROUBLESHOOTING

of steering, proportionally, in both directions. Usually adjusted by a thumb wheel, there should be markings from 0 to 10. In your case, the indicator should be at 10 for maximum steering.

Some radio systems also include ATV adjustments for steering. The ATV knobs are used to adjust the amount of steering travel, either to the left or to the right. Both knobs—usually marked "l to 10" and "right" or "left" ATV—should be set at maximum travel with the indicator on 10. If you've checked to ensure all these adjustments are set for maximum servo travel, but the steering problem persists, the cause may be mechanical.

Whether you're using a servo-saver or a servo horn (a servo-saver is highly recommended), the point where the linkage is attached should be approximately $1/2$ to $5/8$ inch from the center of the splined output on the servo. There are also three holes in the stock steering assembly where the other end of the steering linkage is attached. For maximum steering, the linkage should be located in the outermost hole on this, too.

Although it's highly unlikely, the problem could be the result of a defective servo. Try the other suggestions first; then, if your steering is still poor, try using a borrowed servo just to see whether yours is causing the problem.

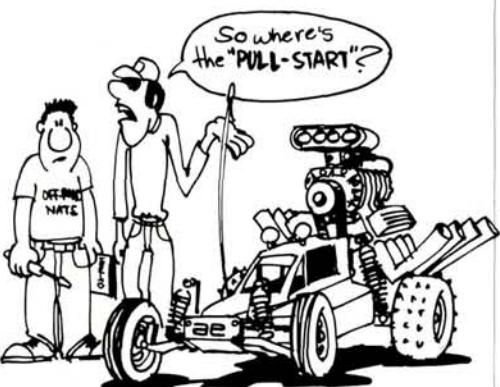
When certain precautions aren't taken to prevent it, interference is a fairly common problem in any R/C car—including the RC10.

When the receiver is mounted on either a graphite chassis or the stock aluminum chassis, there's a tremendous potential for interference. If you do mount the receiver on the chassis, do your best to keep it insulated (e.g., by doubling-up the servo tape and using thick foam insulation). It's also very important to prevent the antenna between the receiver and the antenna post from coming in contact with the chassis.

On the RC10, the shock tower (to which you moved your receiver) is recommended as a receiver mount, but there's still a potential for interference. With the receiver mounted this close to the motor, it's more susceptible to motor noise. This is most likely when the motor is neglected and the brushes and commutator are extremely worn (assuming that you've installed capacitors). With a deteriorated motor, the brushes bounce and arc on the commutator, and this is poison to the receiver. Try cleaning the motor (or send it off for a rebuild, if it's a modified); you should see a much better performance from both your motor and your radio.

As for converting your RC10 to gas power, we have an article in the works on how to adapt the Kyosho Assault rear to the RC10 chassis. As an alternative to gassing your RC10, we recommend a kit like Kyosho's Rampage, which will get you started in gas racing without any scratch-building.

The answers to your RC10 tranny question can be found in the June 1989 issue of **R/C Car Action**. By Mike Winters, "RC10 Tranny Tech" gives complete details on improving the performance of your stock tranny. If you don't have that month's copy, back issues are available.



YOU BE BUGGIN'

I have an RC10 with some major interference problems. To stop this, I mounted the receiver and antenna on the rear shock mount so that none of the wires touched the chassis. This worked well for a while, but lately, it has started buggin' out on me again. How can I stop this? Also, I'd like to make my RC10 gas-powered. Is this possible, and how can I do it? One last question: what can I do to improve the stock transmission on my RC10?

T.R. Vincent,
Little Falls, NY

DON'T GET STEPPED ON

During the past three months of indoor carpet racing, it has become apparent that the Futaba Magnum PCM 1024 radio used by several of our club drivers seems to cause severe radio interference for the other drivers. While not every PCM does this, I don't think that the problem is limited to just one or two particular PCM radios.

After being knocked out of two races, I solved my problem by buying a 27MHz transmitter module and receiver for my
(Continued on page 94)

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TROUBLESHOOTING



Futaba Magnum Senior radio. Unfortunately, not everyone can do this, and some must buy a new radio to compete with drivers using the PCM radio. Have you heard of this problem elsewhere? If so, are there any less expensive solutions, or are we locked into buying a new radio? It's important to keep the fun in racing, and this will never be accomplished with radio interference.

Before you try to suggest a solution for this problem, let me explain how I arrived at my decision that the PCM radios were causing the interference. When my radio was operating on 75MHz, it functioned perfectly during the qualifying heats. At the start of the Main, the only driver who moved up from the B heats was using a PCM radio. No other driver had changed his crystals, but three of the nine racers suffered interference during the Main—to the extent that we couldn't continue.

The radios weren't close to one another, either in location or in frequency. The strongest interference was just under the PCM radio and in a 5-foot radius around it. At the end of the race, cars were put back on the track for practice. As soon as the PCM radio was turned on again, the interference started again.

A week later, the same thing happened again, but this time, I was able to change over to 27MHz, and I completed the race (and took the checkered flag!). Last week, the same thing happened again, but with a different driver who had a PCM radio. When I discussed this with drivers from various tracks in northern Alabama and southern Tennessee, I heard the same stories about different PCM radios. I hope that you can come up with a solution and print it as soon as possible.

Bill Doty,
Huntsville, AL

I race in a PCM-rich environment, so I can understand the problems you've encountered. A number of elements can contribute to the incompatibility of the

(Continued on page 132)

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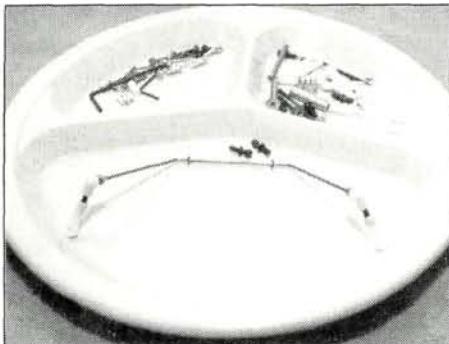
PART 4 BUILDING IT RIGHT

THE END IS NEAR!

WELL, IT'S BEEN a while. The indoor racing season (which was supposed to let me get some things done!) was busier than I'd expected. Anyway, I finally had time to work on the Yokomo* YZ-10 again, so now I'll pick up where I left off.

ANTI-ROLL-BAR BLUES

I ended Part 3 after I'd installed the suspension arms and upper control arms. The next step is to assemble and install the anti-roll bar. I opened bag no. 12 and checked the contents. (Remember, if you only open the bags as they're called for in the instructions, you won't lose anything.) I had to fiddle with these little things called pushnuts, which look like small Belleville washers. With the aid of a 3mm



2. The finished anti-roll bar should look like this. The handy plate prevents the pieces from going anywhere.

locknut, I pushed the first one onto the bar. Actually, it was an effort to get that tiny sucker on! When it finally popped on, I slid it into the position shown in photograph no. 2.

After the ordeal of the first pushnut, I expected lots of trouble, but the second one was very loose, and it slid around on the anti-sway bar. The pushnuts keep the anti-sway bar from sliding around in the rear bulkhead, so I had to CA the loose nut into place. It's little things like these that can make the difference when it

comes to building a car!

Next, attach the brass pivot balls to the anti-sway bar. Although you can use CA, I thought solder would make it more secure. It seemed to take forever for the anti-sway bar to heat up, and when the solder finally melted, it wouldn't cool because of the built-up heat. Eventually, however, the solder did cool, and the balls stayed in place. Don't get any solder on the ball surface, or the plastic ball ends won't move smoothly.

Bag no. 13 holds the parts for the servo-saver, the counter crank and the tie rods. Everything in these next few steps is very easy. Pay attention to the direction of the servo-saver and counter cranks and make sure they match the photos.

STEERING-BLOCK BOOGALOO

When the steering system is finished and the tie rods are assembled, it's time to attach the steering blocks. The kingpins of the YZ-10 go through the front hub carriers and thread into the stock steering blocks. The threads of the steering blocks have been known to strip out, and this causes the kingpins to come loose. To solve this problem, I used CRM's* steering blocks, and I'm really impressed with

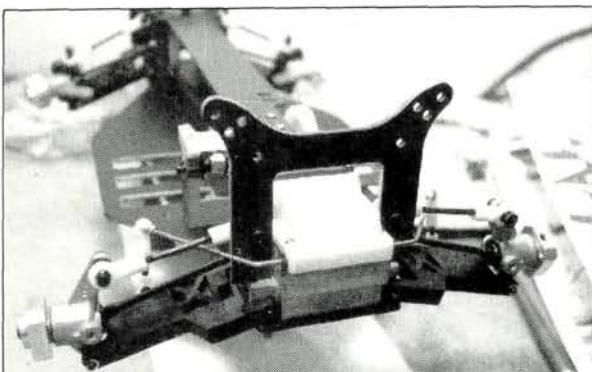
1. Use Bud's Racing Products' solder to attach the ball ends to the anti-roll bar; it's more secure than CA. Note how the pushnut has moved to the right side of the anti-roll bar.

them. They're lighter and stronger than the stock steering blocks, and they come with small, metal nuts that fit into the plastic. The kingpins now go through the hub carrier and thread into the nuts, and they won't strip out. There are two holes to which the tie rods can be attached; start with the front hole, because it's closer to the stock steering block. You can achieve more steering throw by using the second hole. The CRM blocks can also be used at the back of the car for rear hub carriers.

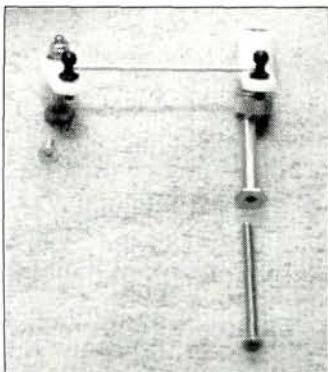
The YZ-10 comes with a simple battery-strap setup that makes battery changes a breeze! To hold the batteries in place, fiberglass pressure plates are locked onto nylon battery mounts with thick body clips. Make sure that the left, rear battery mount is angled so that the body clip doesn't hit the motor mount. To cushion the batteries, I highly recommend that you use some servo tape on the underside of the plates.

I HATE SHOCK ABSORBERS!!

Actually, these aren't too bad. Shock as-



Left: 3. The installed anti-roll bar fits between the upper control links and the universal shafts. The pushnut was glued into place, but not glued to the rear bulkhead.

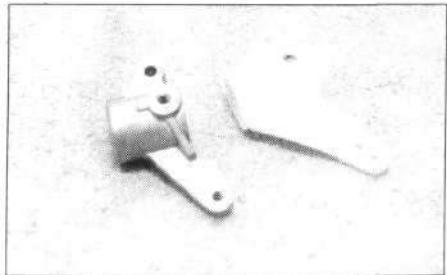


Right: 4. The steering setup seems very smooth; just make sure the servo-saver and counter cranks look like those in the photos.

BUILDING IT RIGHT

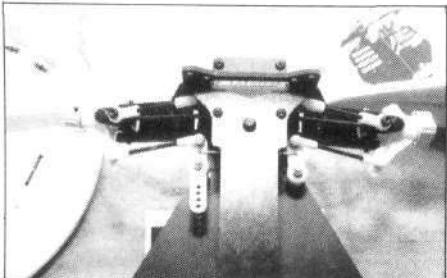
sembly is quite easy, as long as you pay attention to the little washers, the O-rings and the spacers that go on the shaft. The first time I tried to put one together, I couldn't figure out why the oil was leaking out around the shaft. Then I realized that I'd left out this little plastic thing called the outer bushing. Its job is to keep the shock shaft aligned, which keeps the seal of the O-ring secure. Without it, the shaft wiggles around and the oil comes out.

With the outer bushing in place, I reassembled the shaft and forgot the body cap, so it was impossible to screw the shock together. If the shock doesn't work correctly the first few times, you probably left something out.



Above: 5. The CRM steering block (right) is larger, but lighter and stronger, than the stock one. The most important features are the small nuts, into which the kingpins are threaded. These nuts prevent stripping, which can be a problem with the stock steering blocks.

Below: 6. When installed, the steering setup should look like this. The CRM steering blocks have two holes for the tie rods. Use the front hole first; it's closer to the stock hole location.



To make the shocks operate smoothly, fill the shock body up to the threads with the supplied oil. Slowly push the shaft assembly into the oil until it's submerged, and keep the parts at an angle to avoid trapping air in the oil. Thread the body cap into the shock body about halfway, then slowly push the shaft all the way into the shock. Tighten the body cap by screwing it down a few more threads, then pull

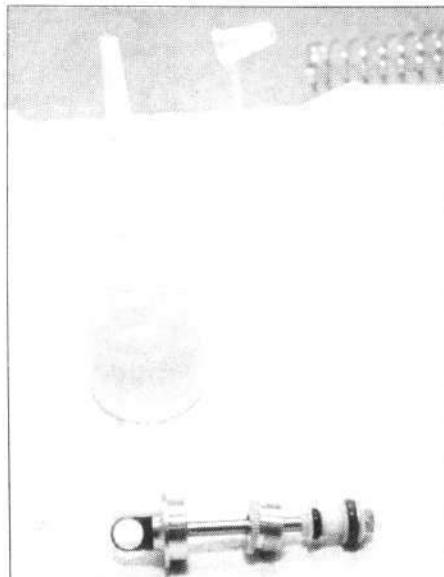


7. Spur gears can be a problem with the YZ-10, because there's a limited selection. SRM makes a gear adapter that allows you to use any spur gear. A spare Belleville washer (plucked from my handy Paragon parts box) was needed to keep the adapter on the center shaft.

the shaft back out and tighten the body cap the rest of the way. This seems to work a little better than the method recommended in the instructions.

SUSPENSION ORIENTATION

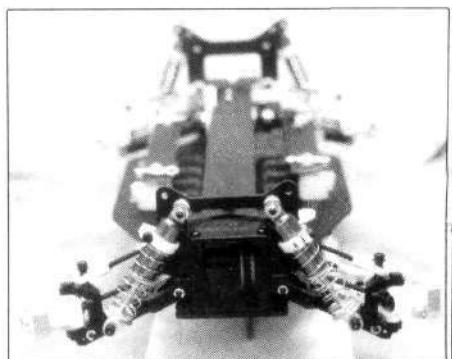
A key to proper suspension operation is the way in which you mount the shocks to the suspension arms and the shock towers. Pay close attention to the photographs and the written instructions to make sure you have the proper spacing. If the shocks aren't aligned correctly between the shock tower and the suspension arms, the suspension will bind.



8. The YZ-10 shocks weren't difficult to assemble. It's important to use all the O-rings, spacers and other parts. I had to redo the shocks a few times before I had everything on in the right order. Pay attention!

If the nuts that hold the top of the shocks to the tower are too tight, the suspension can be greatly hampered. To prevent this, slide the nylon bushing onto the mounting screw of the shock tower, followed by a washer and the locknut. Tighten the nut only enough to keep the shock from sliding back and forth on the screw. When properly tightened, the shock should move freely on the screw and allow the suspension to move without binding. This is a critical part of any car assembly, and it can mean the difference between a car that handles poorly and an A-Main contender.

The last thing I'll cover this time is the spur gear. I had a full selection of 48-pitch gears from Robinson Racing*, and I wanted a way to use them. SRM* one-way spur-gear adapters came to my res-



9. A key to proper suspension operation is the way you mount the shocks. If they aren't spaced properly with the washers, the suspension will probably bind.

cue; they allow you to use any type of spur and pinion combination. I had a problem keeping the adapter on the center shaft, and I had to use a washer to prevent the adapter from sliding right past the E-clip. I'm trying to determine the proper size for the bearing that will fit inside the adapter, and I'll have that information next time.

Well, the way things look, I'll be able to wrap this up in the next installment. I know it seems like it's taken a long time, but you don't want to rush things. After all, don't you want to *build it right*??!

*Here are the addresses of the companies mentioned in this article:

Yokomo; distributed by Associated Electrics, 3585 Cadillac Ave., Costa Mesa, CA 92626.

CRM Racing, 36099 Cathedral Canyon Dr., Cathedral City, CA 92234.

Robinson Racing Products, 165 N. Malena Dr., Orange, CA 92669.

SRM; distributed by CRM Racing.

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KYOSHO BIG BOSS

(Continued from page 33)

THE BIG TEST

To power my beastly Boss, I used a Kyosho 6-cell SCR race pack, charged on the new Hobbico* 905 charger. This

charger has AC and DC charging capabilities, an easy-to-read charge/discharge ammeter and an easy-to-use timer adjustment knob. After a quick 15-minute charge, I popped the battery into the holder, switched on the Pulsar transmitter, and the Big Boss came alive. Anticipating a second run, I placed my second

battery pack on the charger and headed toward the track.

Just sitting on the track, the Big Boss seemed the epitome of power and beauty. Although the initial tests were performed on frozen-solid ground, the Big Boss's substantial power managed to stir up a few

(Continued on page 104)

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"GOLD BARS" #10027

KYOSHO BIG BOSS

(Continued from page 103)

grains of frostbitten dust. The truck was extremely quick and agile. The Big Boss's suspension and overall performance were much better than other Kyosho monster trucks I've tested. No matter how high the jump, the shocks reacted exceptionally well and never bottomed-out; the Boss sprang back onto all fours without toppling over. The Boss corners reasonably well, but it did show a tendency to tip when approaching a turn at full throttle.

I ran the Big Boss for about two hours that afternoon, but as soon as the sun began to hide behind a few clouds and the temperature started to drop, I decided to pack it in. At home, I inspected the truck thoroughly for possible damage and debris in the covered radio box, but it was immaculate and had no structural damage.

While I remained up in the cold Northeast, the Big Boss took a road trip to sunny Florida, where Steve Pond shot the final photos. Last I heard, the Big Boss was flexing its muscles on the beach.

Overall, I was quite impressed with the Big Boss. It's an excellent choice if you

want a truck with fine detail and dependable performance—and it will withstand the abuse when you boss it around!

*Here are the addresses of the companies mentioned in this article:

Kyosho/Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Dan's RC Stuff, 9525C Cozycroft Ave., Chatsworth, CA 91311.

Paint by Von Erich, c/o GLD Racecars, 370-B Commack Rd., Deer Park, NY 11729.

Sees Precision Machine Works, 1414 W. 134th St. #2, Gardena, CA 90249.

Hobbico/Great Planes Model Distributors.

advises that you cut cooling ports in the radio compartment.

The XL-2 is a good electronic speed controller that should fit nicely into most cars and trucks. The shortness of its leads may be a problem in some of the larger trucks, but short leads do improve performance, so it pays to find a location that enables you to avoid having to use extension cables with power-robbing connectors on both ends.

If you do decide to replace the poor-quality stock connectors with hotter versions, be very careful not to swap the black motor lead with the black battery lead. Swapping these leads means certain death to any speed controller. The XL-2 doesn't have the lowest resistance that I've measured in a 7-FET speed controller, but its significantly lower than its reversing stablemate, the XL-1. At a suggested retail price is \$70, the Traxxas XL-2 could be just what you need to replace that ailing mechanical speed controller.

*Here's the address of the manufacturer featured in this article:
Traxxas Corp, 12150 Shiloh Rd., #120, Dallas, TX 75228.

SCOPING OUT

(Continued from page 61)

slamming turns.

When I installed the 7-cell pack, the car really started to fly. By this time, several people had gathered to watch, and they all were amazed at its speed. When I checked for heat at the end of the run, the motor was quite warm, and the XL-2 was slightly warmer than it was before. The built-in heat sink seems to work, as long as there's enough cooling air. If you're installing the XL-2 in a closed-chassis car, such as the Traxxas Cat, Traxxas strongly



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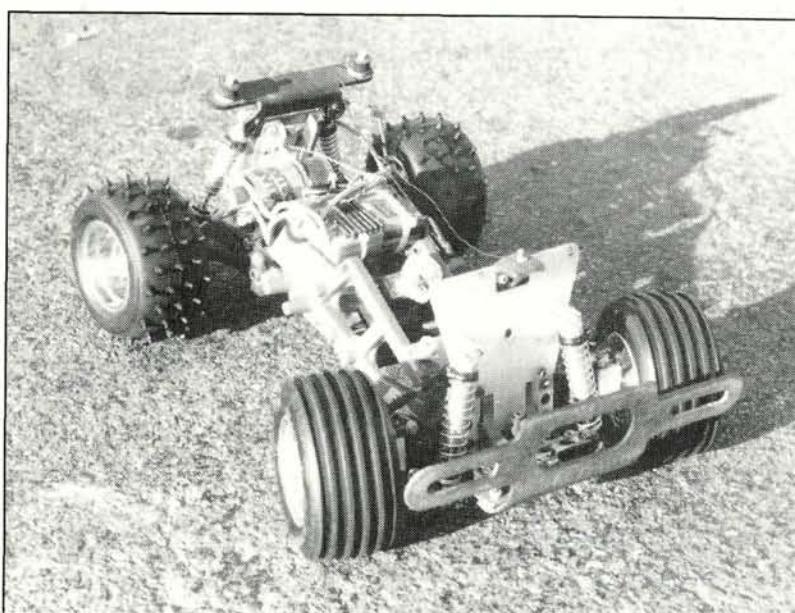
1414 W. 134th St., Gardena, CA 90249

RACING

MONSTER
TRUCK
RACING



by RICK HOULE



In the ever-growing monster-truck market, nearly every manufacturer makes MT hop-up parts. The Tamiya Blackfoot is a favorite truck to modify.

Team driver Jack Johnson interested Team Losi in monster trucks when he converted his JR-X2.



After much anticipation, Team Losi released the JR-XT, which is a complete MT kit based on its JR-X2.



MONSTER TRUCK (MT) RACING is a unique blend of form and function. Peculiarly American, R/C monster racing trucks combine the visual appeal of the "car crushers" with the high-tech performance characteristics of true, off-road racing machines. As a result of this, MTs have experienced an interesting metamorphosis from humongous, high-rise, stiffly sprung, fun trucks, to lower, wider and more softly sprung racing machines that look more and more like stadium-style rigs.

One-tenth-scale MT racing is undoubtedly one of the fastest-growing segments of R/C, even though the first MT racer wasn't even 1/10 scale. One of the first trucks to receive the racing mods treatment was the Marui* Big Bear. The popularity of Big Bear racing enjoyed a remarkable expansion for just over a year at tracks everywhere, and there were even Big Bear Championships at Ascot Raceway in Gardena, CA. The Big Bear racer was inexpensive, uncomplicated and easy to build, and serious mods were, in many cases, simply not allowed. The tradeoff, however, was that they weren't lightning fast and didn't handle well over tall jumps and on rough tracks.

The design of the Big Bear's front suspension made it almost impossible

M.T. & TERMINATOR

MONSTER TRUCK RACING

to mount shocks without serious reconstruction. The rear end, however, easily took a wide variety of shocks. Many tracks wouldn't allow ball bearings, but most smart drivers installed more efficient diffs like the ones available from MIP* and Thorp*. Because of the enormous stress put on the steering systems by the beefier tires, servo-savers, such as those from Kimbrough*, are a must. Heavy-duty ball ends were also necessary for off-road racing.

The Tamiya* Blackfoot is notable as the first kitted MT conversion. The kit was basically a Frog chassis with MT tires and wheels and a Ford truck body. The Blackfoot was easier to modify, and its longer suspension travel made it better suited than the Big Bear to off-roading.

With the rapid growth in popularity of MT racing, many manufacturers of after-market performance parts began to look seriously at this new phenomenon. CRP* was one of the first companies to offer a wide range of goodies (suspension arms, chassis stiffeners, adjustable motor

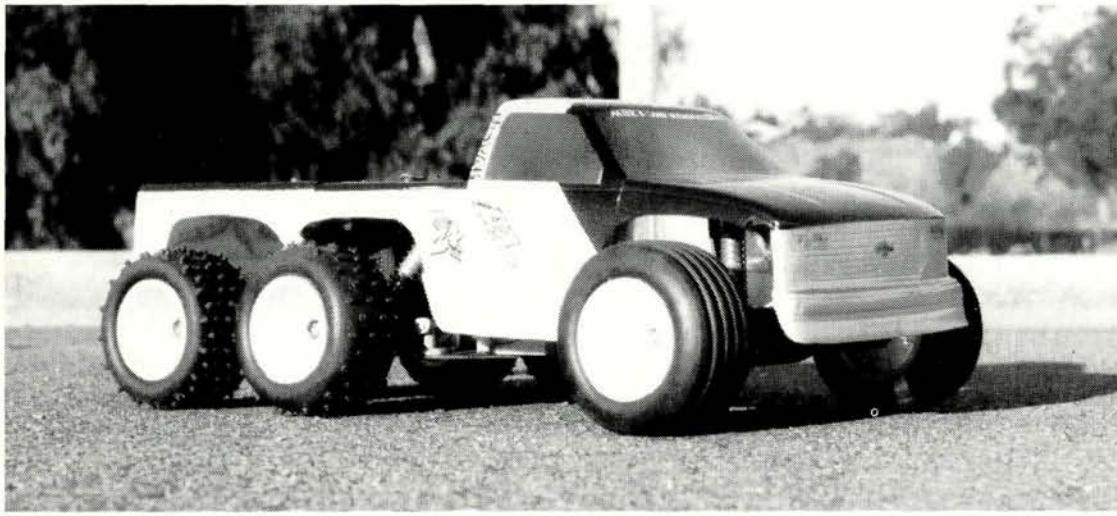
Here's a typical converted JR-X2, with parts from various manufacturers.



range to choose from in the wheel department: Advance Engineering*, Tecnacraft*, TMS*, Sess*, A&L*—the list goes on.

JG, Race Prep* and Parma* bumpers are some of the heavy-duty types seen on many racing trucks. Other companies offering various hop-up parts for the Blackfoot include: Cheetah* (diff-bearing supports, suspension arms), RCRC* (dogbones), and even Tamiya—the

Next, look at the suspension. Longer shocks are relatively easy to install up front (Option House* Golds are popular in my area), but in the rear end, it's a different story. Most racers aren't satisfied with the stock, horizontal position of the Blackfoot's rear shocks, and I've seen many different mounting arrangements. A CRP rear-suspension support with a long shock mounted to the rear trailing arms just in front of the axle housings gives you as much travel as you could want. Many early Blackfoots were run without shocks up front, using only an anti-sway bar for dampening.



Daryl Lane (the "L" of A&L Mfg.) unveiled the Terminator at a recent race in California, and it was surprisingly successful.

mounts, etc.) to help your Blackfoot outperform the have-nots.

Pro-Line* has become widely known for its full selection of tires and wheels, and it has predominated since the early days. Today, you can choose from many brands of tire: Imex*, JG Mfg.*, Losi*, Tamiya, Hobbico*, Bru-Line* and CRP (to name just a few). There's also a large

Blackfoot's manufacturer—makes hop-up parts.

MAKING MODS

The first things to consider when preparing a Blackfoot for racing are the tranny and friction points. A full set of ball bearings all around and a Thorp diff will increase speed and reliability.

LOSING WEIGHT

There isn't much you can do to shed weight from the Blackfoot's chassis. Obviously, you can shed a few ounces by replacing the hard, plastic body (which has roll bars, bumpers, etc.) with a lighter, polycarbonate one. Unfortunately, when you start to add metal diff gears, oil-filled shocks, etc., you put the weight back on.

Most speed-crazed off-road racers like to see their rigs fly through the air over jumps. Though a major improvement over the Big Bear, the highly modified Blackfoot still isn't the most graceful vehicle on high jumps, moguls, etc.

When JG Mfg. built the first RC10 truck conversion in 1987, it set the MT racing scene on its ear. The kit was simple

and contained Kydex mounts for a truck body and wheel adapters to mount Blackfoot-type wheels to a stock RC10 chassis. These new trucks were so superior—even to the most modified Blackfoot—that a separate class had to be formed: "Open Truck" or "Modified Monster Truck" were the designations given to these high-tech MTs. Because the trucks in this class are converted, race-proven cars, they can be run with 7-cell batteries and open motors.

A popular setup is an RC10-type, graphite chassis (i.e., Associated*, Composite Source*, etc.) with an MIP transmission, A&L trailing arms, Kyosho* Gold shocks and Andy's* A-arms. You can take your pick from any number of available conversion kits. CRP offers conversions for: FX-10, Hornet, Ultima and RC10. JG Mfg. offers conversions for JR-X2, Ultima, RC10, Optima Mid and Yokomo YZ-10.

Pro-Line is currently enjoying great success with its conversions for RC10, JR-X2, Ultima and Raider. For the most part, these are complete kits that contain body, body mounts, axles, wheels and tires. JG Mfg. and Pro-Line both offer direct, bolt-on wheels (no adapters needed) in their kits, and A&L also manufactures bolt-on wheels for RC10 and JR-X2.

CONVERSION CRAZE

From 1987 to 1990, the demand for conversion kits skyrocketed, and the companies producing them flourished. Team Losi gained interest in MTs after team driver Jack Johnson converted his own JR-X2 into a racing MT. Losi gambled on a successful future for MTs and decided to produce its own conversion in a complete kit.

To its already proven JR-X2 racing car, Losi added a longer graphite chassis, body mounts, a stadium-type truck body, tall shocks up front and three-piece wheels with real rubber tires. This new creation

was labeled "JR-XT," and it first appeared on the market in November '89. The low-rotating-mass JR-X2 tranny was ideal for the low gear ratios of MTs.

The timing couldn't have been better for the kit's Toyota Stadium Truck body, as this new look was just coming into vogue among modified-truck racers. MT owners were becoming keenly aware of



This 6x4x2 truck (six wheels with 4WD and 2WS) is legal, as NORRCA rules don't limit the number of wheels, so you may start seeing more of these beasts soon.

the similarities between their trucks and a particular style of racing and the full-size Mickey Thompson Motor-sports-type trucks. Even JG Mfg. decided to produce its own complete "Stadium Race Truck," and the first kits should be available by the time you read this.

JG's Stadium Truck is jam-packed with features like a graphite chassis with an 11-inch wheelbase, a full ball-bearing kit, a '90 Chevy truck body, ball-bearing/servo-saver steering linkage, a wide front end with in-line steering, and a new JG transmission with 48-pitch gears (early trucks used the readily available 32-pitch gears). Sixty-four-pitch gears couldn't handle the stresses of MT racing, and most drivers opt for 48-pitch gears like the ones that come with the JR-XT.

We've covered a lot of ground on the MT racing scene, but there's still another whole area of MTs that we haven't yet explored.

For a while, Tamiya was riding the crest of a wave with the ESPN monster-truck look by producing a series of kits like Vannesa's Lunchbox, Midnight Pumpkin and Monster Beetle.

These were all great vehicles for chasing the family dog around the yard or entertaining friends on camping trips, but they weren't entirely suitable for racing.

(Some of these trucks have been spotted on racetracks, but their performances have been mixed.) When the sales of these "fun" trucks began to climb, Kyosho jumped on the bandwagon with trucks like the 4WD Double Dare (the Clod Buster's challenger) and the 2WD Hi-Rider Vette and Big Brute. At the hands of driver Andy Aarons, a modified Big Brute even won the Production Truck Class at the first annual NORRCA Truck Championships in 1988.

Recently, Tamiya has shown a keen interest in the MT racing scene, as

shown by the newest addition to its already crowded stable—the King Cab. Early reports on this truck suggests that in box-stock form, it's showing that it's a real contender.

Traxxas* recently introduced an MT version of its Bullet—the Sledgehammer. The assembled version of the Sledgehammer gives those who can't endure a lengthy construction process a very quick, convenient way to enjoy car-crushing. The Sledgehammer includes a pistol-grip-type radio and a fully proportional, forward/reverse, electronic speed control. With its eight, oil-filled, coil-over shocks and beefy, dropped-down suspension, this is probably one of the toughest trucks on the market.

Well, that's where monster-truck technology is today, but what about the future?

(Continued on page 133)

SCHUMACHER PRO CAT

(Continued from page 68)

well as a torque limiter and added Mosfets for lower voltage loss and higher amperage capacity.

Last, but not least, I installed a Trinity 1700 series King Kong motor. This

double 13-turn wind delivers the kind of horsepower needed to push a 4WD car to maximum velocity.

CATAPULTING

For the first test-run and photo shoot, I packed my bags for Orlando, FL, to escape New England's winter weather. Universal Supplies' track on International

Drive in Orlando ranks as one of the most well-kept off-road racing surfaces, and its high-bite, red-clay surface provided ideal conditions for the initial tests.

Bill Horne, one of the "top dawgs" at the neighboring Lake Whippoorwill International Speedway, was more than willing to give the Cat a whirl as I tried to capture it on film. After peeling off a couple of rolls of film, I charged a few more batteries so I could put in some track time. The Cat lived up to its name: it seemed to run with leopard-like prowess. The King Kong motor gave the Cat a real kick (a tad taxing on the battery, mind you, but proper gearing will get you through). Even with my eyes closed, I could tell that the Cat was approaching because of the belt drive's trademark whine.

Aside from a few skips and jumps, which can be cured with a lighter shock oil, at high speed, the Cat tracked like a champ on the straightaways. Going into the turns, the inherent 4WD push was noticeable, but the sticky clay track kept this to a minimum. Coming into the hairpins with a full head of steam, a slight blip of the brake wheeled the rear end around. The one-way bearings on the front drive

(Continued on page 117)



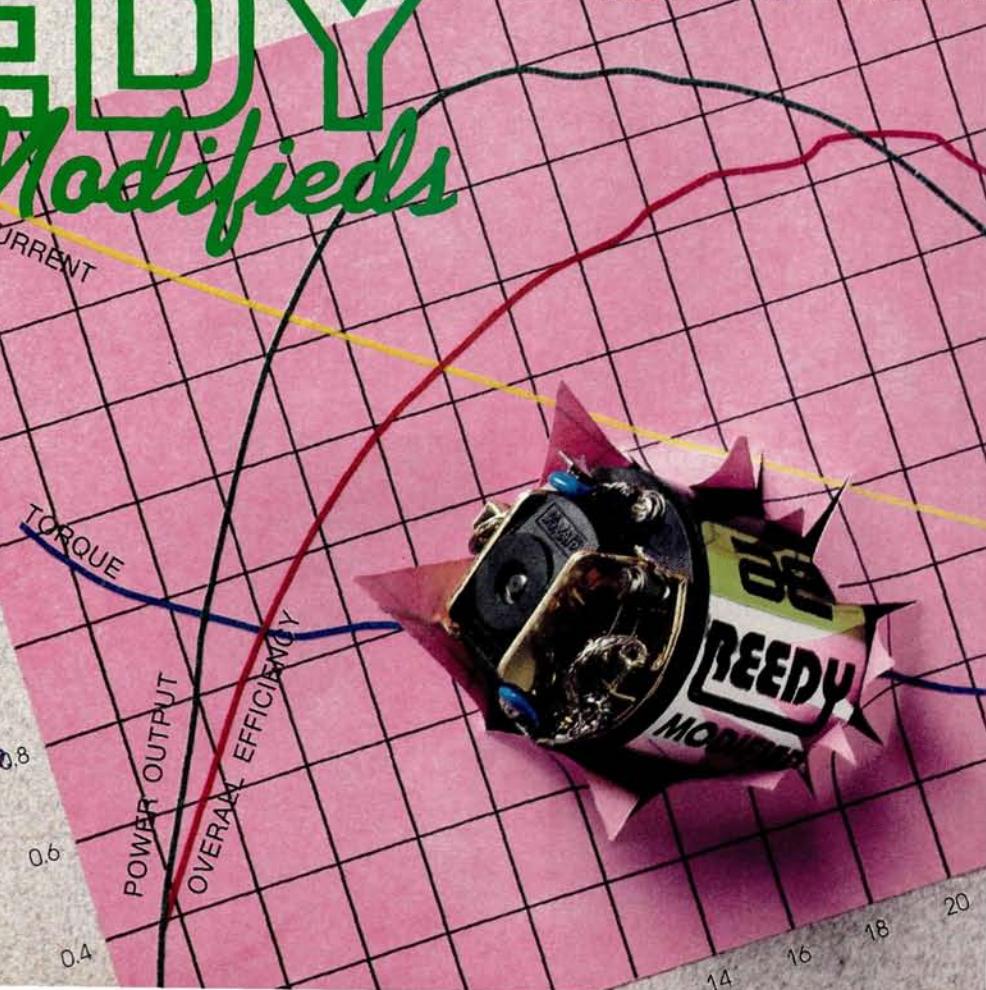
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The Outburst of
New Technology.**

(Graph shown represents actual readout of Reedy Modifieds motor.



SCHUMACHER PRO CAT

(Continued from page 114)

shafts limit the braking to the rear wheels, but this can be used to your advantage on a tight track. (It's something like pulling a parking brake in a passenger car: it will turn around in the same lane.)

I didn't have much time to prepare the car for this particular track, so jumps were a little tricky. If I kept a constant throttle, the Cat flew straight and level, but when I backed off slightly, the Cat burrowed its nose into the ground. From my previous experience with the XLS, however, I knew that with a little tuning I'd have the Pro jumping true to form. (I believe that these cars are the best fliers in the business!)

The new Pro Cat is no secret weapon; in fact, it handles very much like the XLS. With the updates, it will now run at race pace for much longer, but there's still room for improvement.

Despite the change in the rear diff configuration, fine dirt particles can still enter the thrust assembly on the adjusting screw; this can cause it to bind and to change tension. On the plus side: both diffs can be adjusted (or readjusted) in a

matter of seconds; with most other four-wheelers, this takes several minutes.

The front diff pulley is still a source of annoyance. The pulley is crowned, which in theory should keep the belt running on center, but, just as with the earlier Cats, the long drive belt wanders off the pulley and rubs the diff housing. For convenience, I'd like to see the shock spring shims replaced with an adjustable collar. The shims, which come in various sizes, are used alone or with others to obtain the proper spring tension. There are four spacers for each of the four shocks, and they're just another 16 parts that can be lost in that bottomless pit—the toolbox.

If you take a look at the big picture, these inconveniences are very minor, considering the Cat's performance. Subsequent tests on average, less-than-perfectly maintained tracks show that this is where the Pro Cat belongs. When it comes to soaking up the bumps and potholes on many neighborhood tracks, it's at the top of the list, and if you pay close attention to maintenance, you'll have a solid performer.

**Here are the addresses of the companies mentioned in this article:*

Schumacher USA; a subsidiary of Trinity Products,

1901 E. Linden Ave., #8, Linden, NJ 07036.

Magic Motorsports; a subsidiary of Trinity Products.

Futaba Corp., 4 Studebaker, Irvine, CA 92718.

Tekin Electronics, Inc., 970 Calle Negocio, San Clemente, CA 92672. ■

IEDA WINTERNATIONALS

(Continued from page 80)

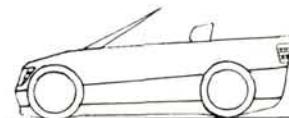
BRACKET CARS

The true run-what-ya-brung class—bracket cars—had the second largest field of competitors (18). You can enter a Frog, Clod Buster, RC10, whatever, and the idea is to qualify with the most consistent ETs. The timing lights are programmed to give the slower car a head start. If you run a quicker ET than you qualified with, you're automatically disqualified, and the other car wins. Stan Wagner took top honors with his classic rail powered by the new Reedy Espirit motor; Mike Rachwitz was the runner-up (RU) with a Twister-powered Illusion dragster; and Bill Brier took 3rd place. All three are local hot-shoes.

PRO COMP

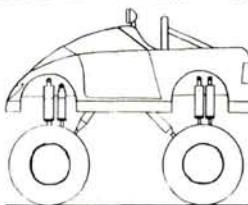
This was my favorite class, because of the cool street-rod bodies. The rules require

(Continued on page 118)



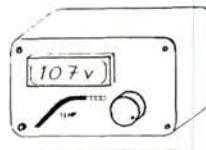
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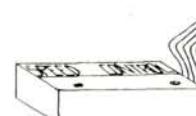


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IDEA WINTERNATIONALS

(Continued from page 117)

the shell to be a full-bodied car, five-years-old or older, like Ken Hively's '55 Chevy. Hively has been drag racing for many years; it's "the only kind of racing" he does! With a Houge chassis and Twister power, he set low ET in class and

kept up the steam through the finals to become Pro Comp National Champ!

The sole female competitor at the event, Jill Simms, was definitely one of Team Houge's top guns. She turned in the third-quickest ET in qualifying and nailed down the Runner-Up title. Firefox hot-shoe Jamie Colon won 3rd place with his Team Astro-powered Firefox Pro Stock

chassis. So far no one had broken the 2-second barrier.

PRO STOCK

Local quick-draw Terrence Holt definitely had his dials set properly on Sunday. After winning Top Qualifier, National ET Record and Top Eliminator, you know he

(Continued on page 124)

NEW

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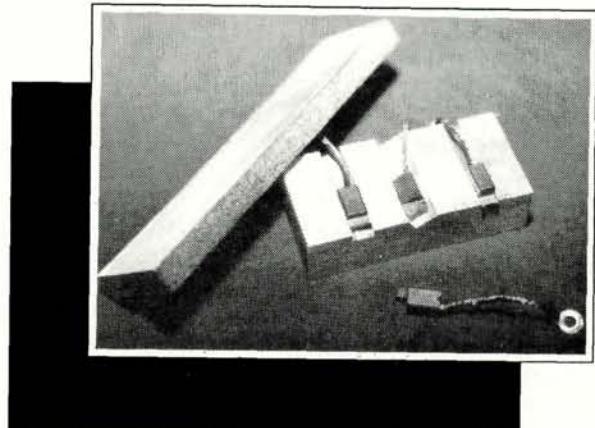
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DIRT DIGEST

by BILL O'BRIEN AND BOB KANE

DO THE RIGHT THANG!

EVERY ONCE IN a while, you have to put on the skids, come to a stop, and make sure everyone's running the same race at the same time. I found a good reason to do that a few days ago, and I thought I'd pass along some information that *should* be common knowledge, but doesn't seem to be.

GET YOUR BEARINGS

Last week, I was at Bruckner Hobby looking for an SCE 7-cell pack for a project I have in mind. (Steve Pond disapproves of it; he can't rationalize putting a 50,000rpm motor in a dirt buggy, even with a two-speed transmission.) Next to me, a young man and his father were buying a similar pack. The batteries in question sell for \$49 as an assembled pack, or to put it another way, the cost of the battery pack, plus \$10, would equal the price of the entry-level, off-road buggy he owned. He was going to put that battery pack in a car that he'd already "modified" with ball bearings, a Trinity stock motor and a Novak T4 electronic speed controller. While these are by no means bad modifications, they represent some really off-center approaches to upgrading a buggy. As Rich Hemstreet intimated in his "Pole Position" column a few months ago, batteries are only 16.6 percent of the

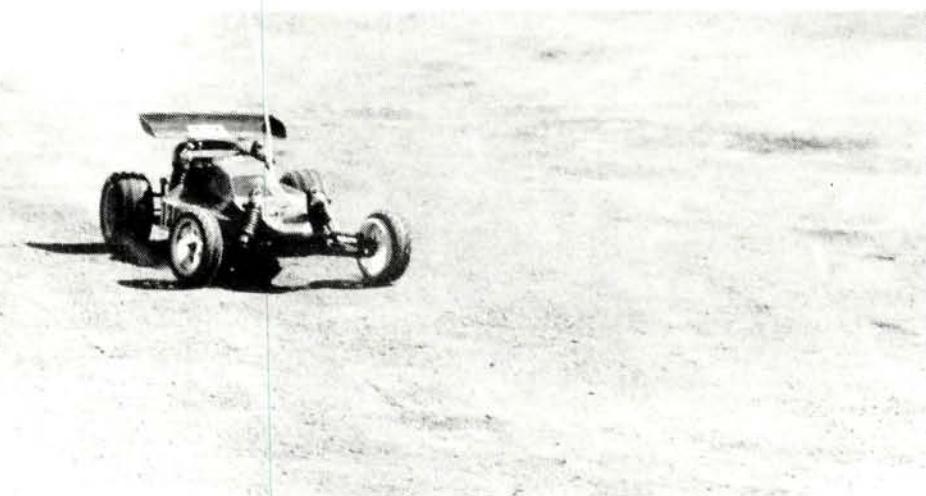
total picture; driver, car, track, motor and gearing must also be considered.

The only things this young man had right were the bearings and the motor. Given his car's inherent limited performance potential, even a motor with a slightly better wind would have been appropriate, but certainly nothing more than that. With the motor limitation in mind, the Novak T4 (which is a great speed controller) is an extreme case of overkill. The car comes with a fine, three-speed mechanical speed control that's more than adequate to handle the range of motors that will work best for this type of buggy. (*Editor's Note: When the time comes, the electronic speed control can be put into a high-performance car. As to*

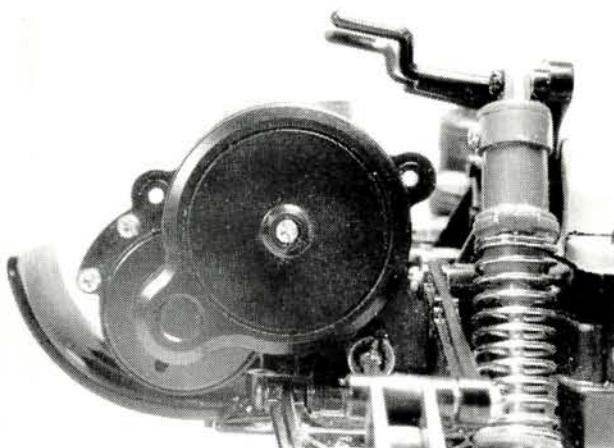
the practicality of buying an ESC for an entry-level car, there's much to be said on both sides.)

Having "modified" his car, the youngster now wanted to extend his run time with the SCE 1700mAh battery pack. Although that's a noble idea, he's going about things the wrong way. It's better to begin by adjusting the spur/pinion-gear ratios to obtain a more or less precise 4-minute run time, based on your driving technique, and this can be done with a normal SC 1200mAh battery.

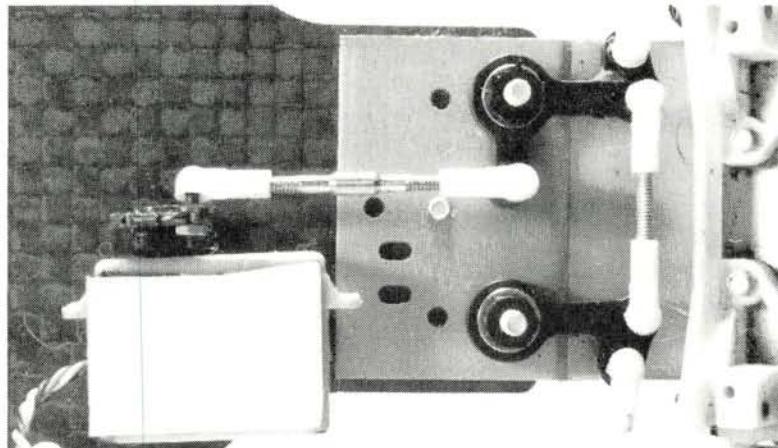
After you've set the gearing for stock applications, you can start make modifications and evaluate the way they change the run time. Higher ratios produce faster acceleration, lower top speeds and longer



PHOTOS BY BILL O'BRIEN



Left: A quick-change diff really should be quick, so don't bother to use the two outside screws on your Astute, Madcap or King Cab.



Right: If you change the standard bellcrank in your RC10 or Optima, be sure to use a servo-saver on the steering servo. If you don't, the first crash may be the servo's last!

DIRT DIGEST

run times; lower ratios provide slower acceleration, higher top speeds and shorter run times. If you go with a higher gear ratio, you might want a slightly more brutal motor with higher rpm to recover the lost top speed.

As you go up this modified ladder, you'll probably find that the perfect gear and motor combinations leave you a little short of your 4-minute mark; *this* is the time to experiment with batteries. This brings you back to the bottom rung of the ladder because, if you've really done your homework with the gearing and the motor, the larger-capacity batteries should extend your run time beyond 4 minutes, and that gives you leeway to experiment more. (Unfortunately, on many entry-level cars, it isn't easy to make gear changes; you might almost say it's impossible.)

There's an old saying, "If it doesn't work right, throw money at it." It isn't a valid saying, just an old one. This kid just shelled out more than \$130 in speed equipment for his \$60 car, without taking the time to learn anything from it. With that \$130, he could have bought a basic RC10, which is not only a great beginner's car, but can also be upgraded to true high-performance standards. With the \$60 he spent on his original car, he could have started up the modification ladder.

I have a vested interest in making sure R/C cars are loved for years—I enjoy writing this column! If we don't start planning the steps we take, however, this sport will fold in on itself. The best motor and speed controller in the world won't make an uncompetitive car run with the leaders; they'll only make it uncontrollable. Higher-capacity batteries will give you longer run times, but if it takes you 5

minutes to run a race that other people are completing in 4 minutes, you haven't accomplished anything!

The secret is to *think*. Your brain isn't directly connected to your wallet. Putting money down on a counter isn't an involuntary reflex response! You might be attracted to the creative ads that describe how great everything is, but you're better off reading the articles that tell you the best ways to apply all those goodies.

In the words of the Merry Marvel Marching Society: 'nuff said.

BEARINGS AND CRANKS

Another "common-knowledge" item: quite a few after-market manufacturers are creating high-tech, ball-bearing bellcranks to ease your steering chores. Although they're a great idea, in some cases, they replace stock bellcranks that also do double duty as servo-savers (notably in the Optima, Ultima and RC10).

TAKE CHARGE

WEELCOME TO BATTERIES 101. Before you spend a fortune on batteries for your buggy, you should know some of the basics. Essentially, batteries come in three flavors: SC, SCE and SCR.

The SC type is the old standard, and it puts out 1200mAh of current. For the non-electrical engineers in the group, mAh stands for milliamp hour ("milli" meaning thousandth, from the Latin *mille*). This rating indicates the battery's discharge properties over time, and 1200mAh is advertising hyperbole for 1.2 amp hours. If discharged at 1.2 amps, an SC battery will last for an hour. (That's under ideal, laboratory conditions; actual times may vary.)

SCR batteries are the stock racer's favorite. The "R" indicates that these have a higher discharge rate, because their internal resistance is less than that of SC cells. If you remember Ohm's law and how it applies to power, resistance and voltage, you'll see how this is possible, even though SCR batteries may have the same 1200mAh rating as SC cells.

On the other hand, SCE cells have an extended capacity (hence, the "E" designation). Typically, they're rated at 1700mAh, but even 1300mAh and 1400mAh cells qualify under the strict definition of SCE.

Some of these batteries also come in "pushed" versions that discharge at a higher rate than even the SCR normally

would. Usually, a battery is "pushed" by breaking down its internal resistance; this is done by quickly charging and discharging at a high rate several times in a row. This trick is often used by national-level racers, and it can give your car the equivalent of a turbo boost.

The use of these batteries can vary according to your experience and your wallet, as both SCE and SCR cells are, comparatively, quite expensive. Generally, SC packs are great for practicing; they can take mild abuse rather well and still work. SCR cells are for stock racing, where run time isn't usually a problem. Stock motors can take the best advantage of the SCR's high discharge rate. SCE batteries work best for modified motors that have a

higher amperage draw and need the extended time that these cells provide. They're finicky, however; for best results, use a soft-pulse or linear charger and rest them at least 24 hours between uses.

Pushed cells can be used anytime you need that extra kick, but be forewarned: breaking down a battery's internal resistance severely shortens its life. A pushed pack might have a life that's $1/2$ to $1/3$ that of an SCR pack, but you're not buying them for their longevity; they're strictly a power option.

Now, with all this information, you should be able to choose the correct battery for your application with some semblance of scientific selection.



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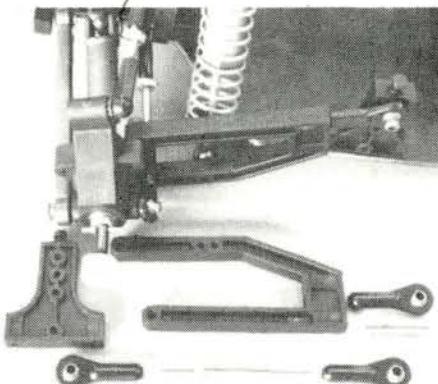
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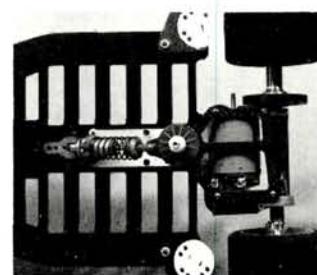


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We all know what servo-savers do, right? So I don't need to explain that they flex when the front wheels encounter the outside wall of the track, or the back of the car in front of you. In most cases, they absorb all the impact to prevent the servo from being damaged. When you replace a bellcrank that also does servo-saving duty, please be sure to install a servo-saver on your servo to take up the whack. Kimbrough* has a whole line of them, and they're much cheaper than the servo itself!

NO REAL BEARING

Tamiya's King Cab, Astute and Madcap sport a new type of differential. It's essentially a ball diff, but Tamiya is touting it as a quick-change diff as well. By unfastening the three screws that hold the differential cover in place, you have complete access to both the spur gears and the pinion gears. The spur is lifted out and the pinion is held to the motor shaft with a setscrew in the conventional manner.

Sounds easy, but anyone who's tried it already knows that getting at the front screw can be a real pain—and there's enough pain in racing as it is! Why should you have to bother with three screws anyway? The diff cover will hang in there if only the center screw is in place.

You can even replace that center screw with a 3x15mm threaded rod. Get a washer and a wing nut to fit the rod (by itself, the wing nut would press down on the spur gear, so you *must* use the washer, and it *must* have a 3mm center hole!). Presto!—you have a real quick-change unit without having to fumble for a screwdriver.

NEXT MONTH

I've finally managed to finish the RS 200 bearing installation, and I'll get to that next month. I think we should take a look at the Avante. I've borrowed a friend's, and from what I can tell, 90 percent of its problems are easy to fix—really easy!

In the meantime, the ground should be sufficiently thawed for many of you to get back on the track, and with the new crop of cars that have appeared, there's a new set of columns to do. Y'all come back now!

*Here's the address of the company that's mentioned in this article:

Kimbrough Products, 1420 East St. Andrews Place/Unit F, Santa Ana, CA 92705.

IEDA WINTERNATIONALS

(Continued from page 118)

was happy! Holt described his car's chassis as a "Dragitator" (modified Agitator), and he chose the new Twister Annihilator 2002 for power.

Even though Ned Morris is co-owner of an off-road racetrack called Brake-A-Way in nearby Norco, he's been a Drag World regular for some time. He earned RU honors with his scratch-built Twister-powered car, and Phil Simms took 3rd place with a CAM-powered Houge Phantom.

An award was given to Mark Schwen-
son for the "Best Reaction Time." He had the quickest trigger finger with a time of 00.002 seconds!

ALCOHOL FUNNY CAR

Where do people like Gary Reeter come from? Even though he'd never raced in R/C drags before, he scratch-built a car with a Team Astro powerplant a week before the competition and won the class after posting the 2nd fastest qualifying time! Mike Myhre was class TQ, but finished as RU. Team Losi's Jim Schauer

finished 3rd with a Houge car motivated by a Revolution motor.

TOP FUEL FUNNY CAR

This is where the big-bore motors come into the picture. Chris Fine turned in the lowest ET (2.22) in class with the Big One motor, and he backed that up with the final win. Vern Tripp, with his fleet of In-N-Out Burgers cars, rose from the last qualifying position to the RU spot! He piloted a scratch-built chassis stuffed with a huge Team Astro Top Fuel II motor. Dennis Hill, from Ascot Raceway in Gardena, CA, placed 3rd with a Twister-powered Illusion car. Still no break in the 2-second barrier!

TOP ALCOHOL DRAGSTER

Jill Simms will go down in history as IEDA's first Winternational Champ in this class, and she may be remembered as the fastest female driver in the sport!

A Fine Design driver listed simply as Chester P. (long surname), posted the Nat'l ET Record (2.18), but he was eliminated in round three. Jill's teammate, Don Monsko, drove his CAM-powered Illusion car into the RU spot, and Tom Beville piloted his Astro-powered Houge car to 3rd place.

TOP FUEL DRAGSTER

This is where it gets interesting. Armed with the Big One and 20 cells for ammo, Chris Fine posted an incredible TQ time of 1.87 seconds! In the first round of eliminations, Fine made another blistering run—1.85 ET at 68.9mph! After his disqualification, teammate Jamie Colon set three records in a row and even broke the 70mph barrier with an identically prepared car. Mike Houge finally got a handle on the proper gearing arrangement for the Astro Top Fuel II motor and posted an ET of 1.98. When all the smoke had cleared, Houge was the first Top Fuel Dragster Nat'l Champion! Colon took the RU title, and Phil Simms placed 3rd.

As the competitors rode off into the sunset, I went to the nearest saloon in Frontier Town, walked up to the bar and ordered one of those tall-neck bottles of Sarsaparilla I'd seen kids walking around with all day! ■

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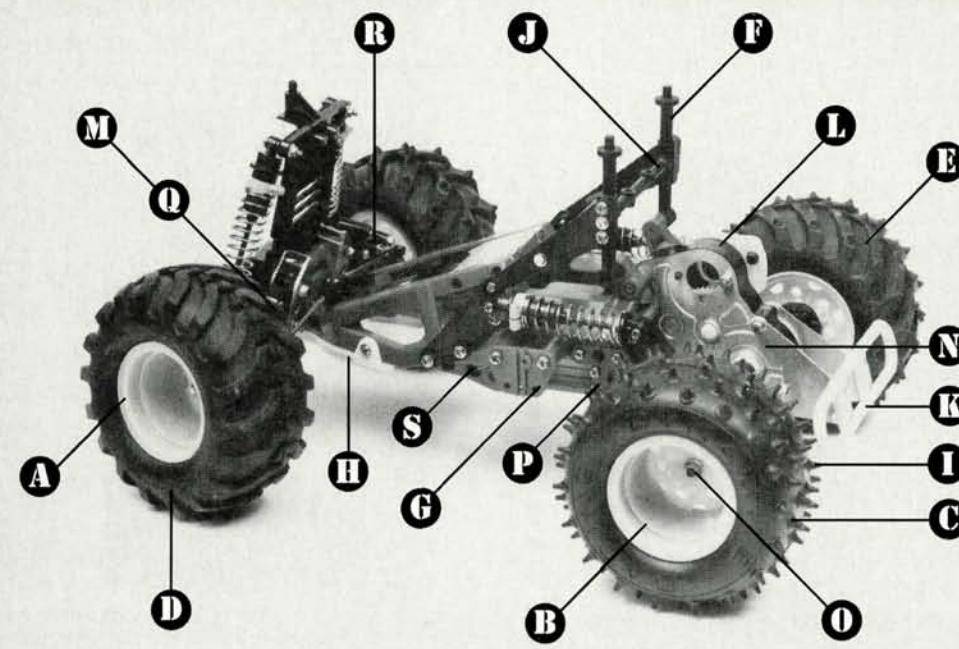
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ELIMINATOR GOLD

(Continued from page 88)

time on the track, the Gold turned in a good performance. Its lap times were a little shy of the regular racing pace, but with a change of pinion and a fresh set of cap tires instead of the original foams, I think it could run at very competitive speeds. In fact, whenever the Bolink factory team has visited Whippoorwill, its members have always been competitive. Because time was limited and I had to return home the next morning, I had to end for the day with very little time on the track, but I think the car's record on this track speaks for itself.

Most of us have a local track that's adequate, but a far cry from Whippoorwill's high banks, and I did the rest of my testing at a fairly typical local facility. Its surface is a flat carpet that, depending on the time of the month, is set up as an oval or as a roadcourse.

The Gold and I tried the oval first. The track record stood at 39 laps, and although I didn't plan to break it in the first few runs, I did manage a pair of 37s and a 38-lap run, which would put the Eliminator

(Continued on page 128)

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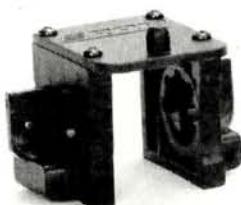
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ELIMINATOR GOLD

(Continued from page 128)

nylon dampener. This lubricant will still allow fluid movement, but it will drastically reduce chassis roll, which contributes to the uneven tire wear.

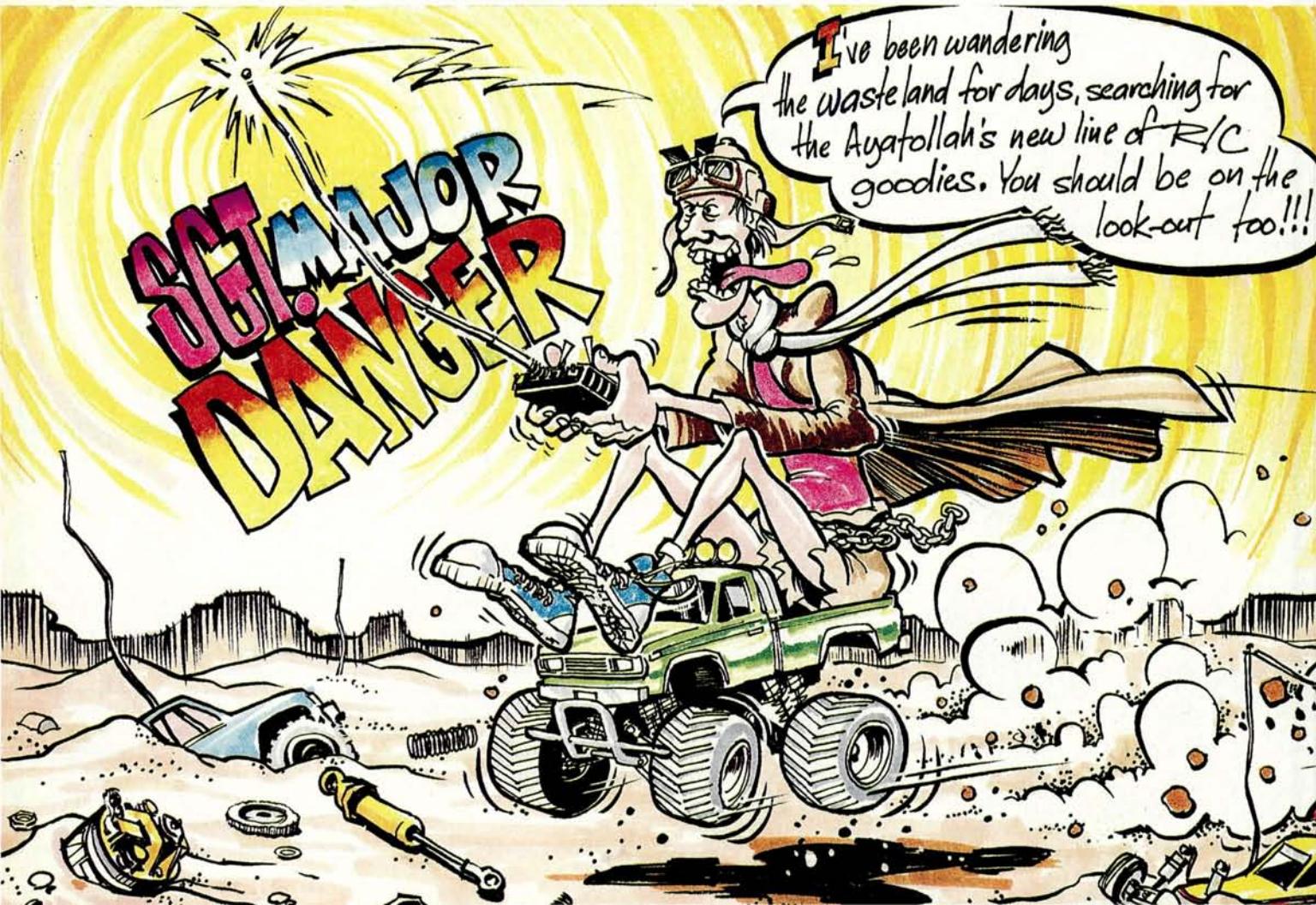
After that, we moved to the roadcourse.

Because the Gold's stock chassis uses a three-battery configuration, it's already ideal for running on road courses. Also, because road-course speeds are considerably slower than those on the oval, there's less stress on the suspension assembly, so the tires wear more evenly and the car handles better. Here again, I bent the kingpins slightly, but this time, I bent both

inward to counter the effects of both left- and right-hand turning. To do this, I obviously had to remove the kingpin brace, but as I've already mentioned, the speeds are considerably lower than those on the oval, where the support doesn't come into play as much.

So has Bolink kept up? In its stock

(Continued on page 132)



ELIMINATOR GOLD

(Continued from page 130)

configuration, the Gold seemed better on the roadcourse than on the oval, but, to be fair, its performance was much better on the oval when it used the optional LTO chassis (Left-Turn Only). The car's basic design is sound, and with the suggested additions, it could be up in the A-Main. Just as with any other car, there's still room for improvement, but if you tinker with it, keeping the racing pace shouldn't be a problem.

*Here are the addresses of the companies mentioned in this article:

Bolink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Motion Graphics, P.O. Box 1590, Westminster, MD 21157.

Trinity, 1901 E. Linden Ave., #8, Linden, NJ 07036.

Magic Motorsports; a subsidiary of Trinity Products.

Tekin Electronics, 970 Calle Negocio, San Clemente, CA 92672.

Futaba Corp. of America, 4 Studebaker, Irvine, CA 92718.

Robinson Racing Products, 165 N. Malena Dr., Orange, CA 92669. ■

TROUBLESHOOTING

(Continued from page 94)

PCM and AM transmitters.

There's a less expensive solution to your problem, but you probably have a problem with the AM radio rather than with the PCMs. Some of the problems that can lead to your being stepped on by a PCM are an out-of-tune receiver and weak batteries in the transmitter, combined with the exceptionally strong signal transmitted by the PCM.

According to Donn Rice at Futaba, the most frequently seen AM-system problem is an out-of-tune receiver. There are a number of reasons why a receiver could be out of tune, but frequency changing is most often at fault. In 75MHz radios, it's against FCC regulations to make frequency changes at all, but in the heat of a race when there are two cars on the same frequency, a change is inevitable. Although we can't recommend a frequency change with a 75MHz system, we can tell you what you should do if you decide to go ahead and change anyway.

When changing crystals in any AM radio system, don't go more than two fre-

quency increments in either direction. For example, if you have a radio on channel 78, you should stay in the 74 to 82 range. Over time, going outside this range can pull the receiver out of tune, and the further away you go from the original frequency, the faster the damage occurs. Even if you revert to the original frequency, the damage has been done. Hard crashes can also take their toll on the receiver. The small adjuster coils in the receiver aren't fixed in place and can move when your car sustains a good shot.

If the racers in your club continue to have problems with their radios in the presence of a PCM, first have them check to see that the batteries in their transmitters are in good shape. If that doesn't solve the problem, send the radio(s) to Futaba to be re-tuned (send both the radio and the receiver). This costs \$10 to \$15, plus parts and shipping. (Generally, the systems don't need parts, only adjustment.)

Another quick fix is to have the drivers using a PCM shorten their antennas to about half mast. The PCM will still have plenty of range, but the signal should be reduced enough to prevent them from stepping on the AM radios. ■

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MONSTER TRUCK RACING

(Continued from page 112)

THE FUTURE

At a recent club night race at our local racetrack (Brake-A-Way), a strange-looking creation was entered in the Open Truck Class, and it caused all eyebrows to rise. You may have seen six-wheel trucks, but have you ever seen one clear double jumps and outrun other fast trucks in the straightaway? Would you believe it if I told you that this thing was hooking tight turns at will, without any signs of pushing? Well, it's true!

Daryl Lane (The "L" of A&L Mfg.)* unveiled his creation—the Terminator—and he raced it with awesome (and very surprising!) results. The truck is a 6x4x2 (six wheels by 4WDx2WS) with four A&L trailing arms. I was race director that night, and Team A&L kept their truck hidden as they brought it to the line, so no one saw it until the race was under way.

The track is sanctioned by NORRCA, and suddenly, there was a mad scramble to find the rule book! Technically, A&L's monstrosity doesn't break NORRCA rules (there's no limit to the number of

wheels), but the future of 6W trucks is uncertain at this time. Whatever the future holds, one thing's for sure: MTs are here to stay.

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Thorp Manufacturing, 380 S. East End, Unit H, Pomona, CA 91766.

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CRP, 3250 El Camino Real, B-3, Atascadero, CA 93422.

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JG Mfg., P.O. Box 6014, Whittier, CA 90609.

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TRACK DIRECTORY

In keeping with our constant efforts to help foster the growth of the radio-control car hobby, we've decided to run this track directory intermittently to inform modelers where they can race and exchange ideas. If you'd like your track listed, send us your name, address, phone number and some information about the track to **R/C Car Action Track Directory**, 251 Danbury Road, Wilton, CT 06897. We'll list as many clubs as space allows.

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(Continued on page 135)

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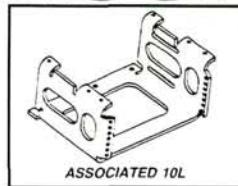
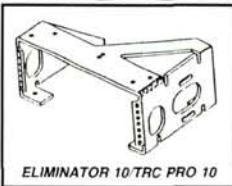
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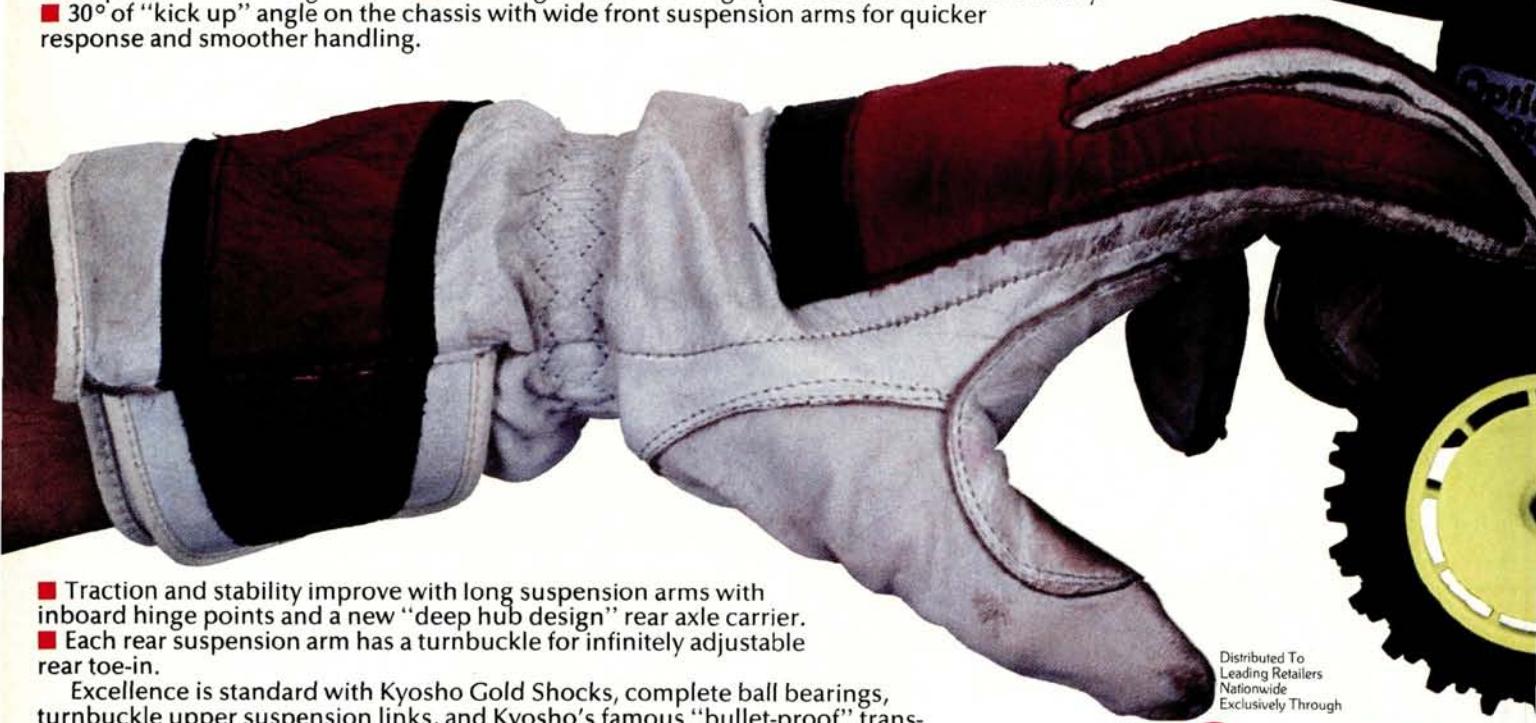
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(Continued from page 137)

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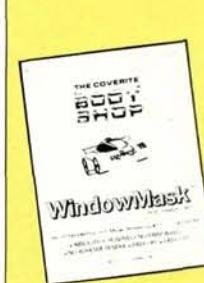
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“...and here are the press-ons I use.”

— Rich Muise



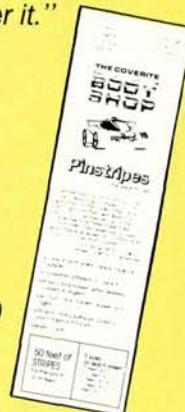
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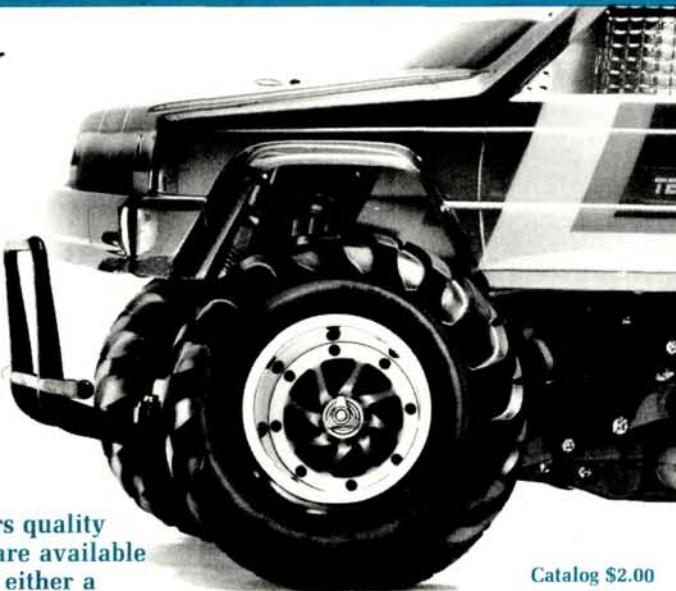
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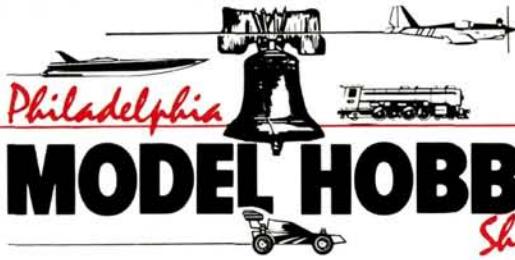
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TOP CAT

MODIFICATIONS

by RICK HOULE

WHEN MANUFACTURERS continue to fine-tune an R/C car after it has been introduced to the public, they often discover that minor modifications can improve the original design. Usually, kits are changed during the production run, but many car makers will help early kit buyers modify their machines for top performance. Such is the case with Schumacher's* newest 2WD car—the Top Cat.

I reviewed this car in the October '89 issue of *Radio Control Car Action*. Although the TC would prove to be a world-class performer (it placed 6th at the '89 IFMAR Champs), I pointed out a few of its shortcomings.

During the IFMAR event in Australia, I ran into Dr. Cecil Schumacher (designer of the TC), who, though less than overjoyed with my report, invited me to the company's pit tent to pick up some upgrades for the TC. "I want to make you a believer in this car," he said.

The next day, I visited the Schumacher pits and met Operations Manager Tim Walden. He explained that the designers had discovered 14 ways to improve the original TC kit, and he gave me the components that the Schumacher Worlds Team drivers were incorporating into their cars for the event. Most of the modifications significantly alter the suspension and steering geometries. The result is a car that handles better and has a slightly shorter wheelbase, a narrower front wheel track and the in-

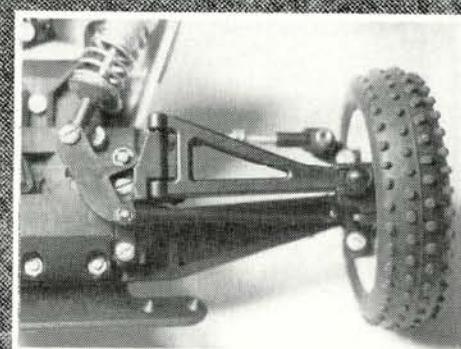
SHARPENING THE CLAWS

genious application of an Ackerman steering angle on the front wheels.

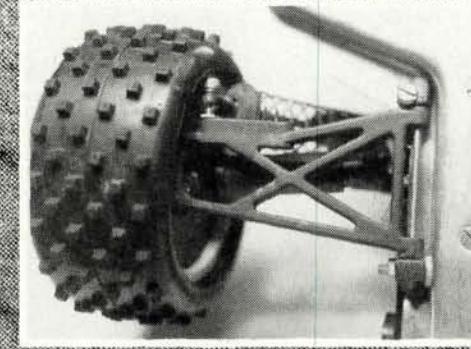
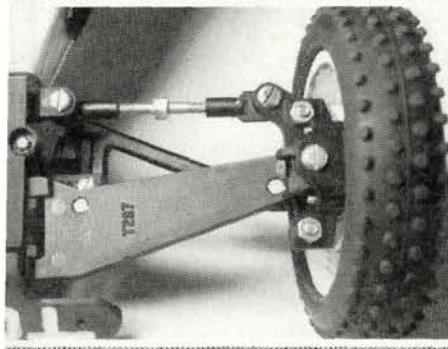
The rear A-arms were redesigned to bring the rear wheels forward approximately 8mm (fig. 1). With the original arms (part no. T200), the drive axles angled back radically from the gear case to the wheels. The new arms (part no. T268) set the axles almost in line with the outdrives and the wheels.

The front end received the most radical treatment. The new top A-arm moves the top wheel pivot point back 5mm from its original position (fig. 2). The new bottom arm brings the lower pivot point inboard 5mm (fig. 3). The top arms are mounted to the chassis by means of front suspension arms (part no. T214), and the pivot point for the new arms has also been moved inward approximately 5mm (fig. 4). An additional tab has been added to this new arm for a screw, which adjusts the front suspension's downward travel and the front end's overall ride height.

The front hub carriers (better known as pivot blocks) are relatively unchanged, but a part has been added



to give the front wheels an accurate Ackerman steering angle. (When a car's front wheels are turned fully left or right, the inside wheel must turn at a greater angle than the one opposite, if the car is to track accurately through the turn.) To accomplish this, the mounting point for the steering-rod links was moved inward approximately 10mm, at about a 34-degree angle. This was done by adding an



Far left: The new top A-arm moves the top wheel pivot point 5mm backward from its original position.

Left: The new bottom arm brings the lower pivot point 5mm inboard.

Right: New rear arm brings the rear wheels 8mm forward, and this sets the axles almost directly in line with the wheels.

L-shaped piece to the original hub carriers (fig. 5). With this setup installed, the turnbuckle steering links are too long and must be replaced with shorter ones. (The car's rear control links are the perfect length for this.)

In my preliminary report, I wrote that the TC's front wheels often hung in the up position when the front suspension was fully collapsed after

landing off high jumps, because the front wishbone struts snagged on the end of the suspension lever (part no. T248). To solve this problem, the lever is replaced with part no. T247. The difference between the two parts is so slight that it's virtually invisible. I can only detect that the hole for the 8mm pin that contacts the struts has been moved outward a mere 1mm (fig. 6).

The remaining mods are minor, but they prove that the Schumacher engineers have been doing their homework. New steering levers have replaced the originals (part no. T241), which sometimes rubbed against each other and affected the steering response (fig. 7).

The tranny's original 21-tooth pulley was mounted on a layshaft and held in place by an 8mm steel pin and

PHOTOS BY RICK HOULE

TOP CAT MODIFICATIONS

a pulley spacer. Some owners reported that the spacer didn't hold the pulley in place well, so a new one was designed. (The differential was also improved, but I didn't receive any parts to review. I haven't uncovered any problems in this area on my car.)

Having just completed the 1989 NORRCA Off-Road Series with my TC (I placed 6th overall in 2WD Stock), I've had ample opportunity to give it a complete shakedown. Its worst characteristic, by far, was its tendency to push badly on loose tracks, but the upgrades seem to have cured this. I only wish I'd had these mods at the beginning of the season!

To reduce some of the car's push, I fitted a pair of Race Prep* four-row, mini-spike tires on the front wheels. Because they're narrower than the Schumacher kit tires, I had to cut approximately 6mm off the inside of the wheels (just outside the third rib) with a Dremel tool.

Another problem for me was the elaborate system used to hold the original wing on the mounting brackets. The O-rings tended to loosen



during major "Lexan trading parties" (pile-ups), and the small pins that held them in place would get lost. A&L Manufacturing's* wing mounts can be bolted onto the body without any drilling, to provide a more secure way of holding the wing on. Although the wing can be mounted with wire and buttons, I chose a Team Hammer* multi-element wing mount with Losi* Quick-Lock fasteners.

In my previous review, I mentioned that the O-ring used to hold the spur gear on the layshaft might not be adequate, but, to my amazement, this system works well. It's better than screw-on or bolt-on systems, too, because it's quicker and easier to put on and to take off.

When I used pinion gears other

than those provided in the kit, I had to fit a 3mm-wide spacer between the motor and the motor plate to align the pinion and the spur gears properly. A Kyosho* Optima motor spacer works well.

The TC is a competitive car, although it takes more work to dial it in than some of its American-made counterparts. After all, tracks in the USA are rougher, more hazardous and have steeper jumps than the European tracks on which the TC was developed.

As for the problem of parts availability mentioned in my October review, I learned from Trinity's Ernie Provetti (the TC's exclusive importer) that the company is taking every step necessary to provide dealers with ample spares. In addition, Trinity will soon establish a Schumacher "hot line" to answer questions from dealers and racers. The BIR Hobby Shop* has a complete inventory of all Schumacher USA products for the Top Cat and the Pro-Cat.

With this kind of support, the TC should be around for a long time, and I understand that Trinity is forming a World Championship Team, which I presume will go after the '91 World Championship to be held here in the U.S.

*Here are the addresses of the companies mentioned in this article:

Schumacher USA, Inc., 1901 E. Linden Ave., #8, Linden, NJ 07036.

R/C Race Prep, 20115 Nordhoff St., Chatsworth, CA 91311.

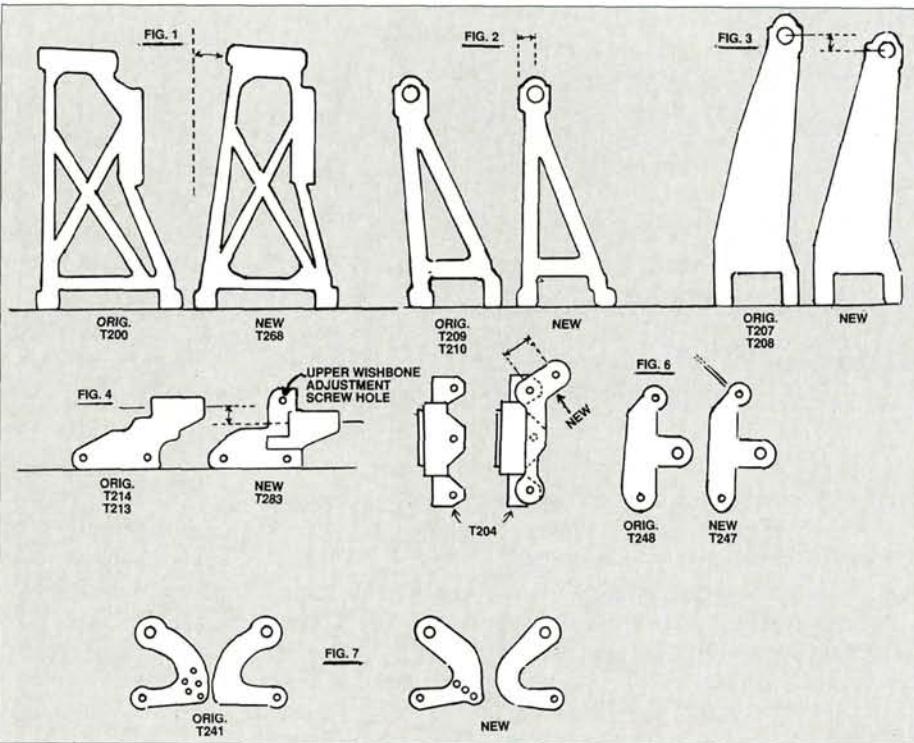
A&L Manufacturing, 1490 W Rincon #J, Corona, CA 91720.

Team Hammer, 903 E Francis, Corona, CA 91719.

Team Losi, 1655 E Mission Blvd., Pomona, CA 91766.

Kyosho/Great Planes Model Distributor, P.O. Box 4021, Champaign, IL 61820.

BIR Hobby Shop, 550 North Ave., Union, NJ 07063.



In this illustration, figures 1 through 7 show the original pieces on the left and the new ones on the right.

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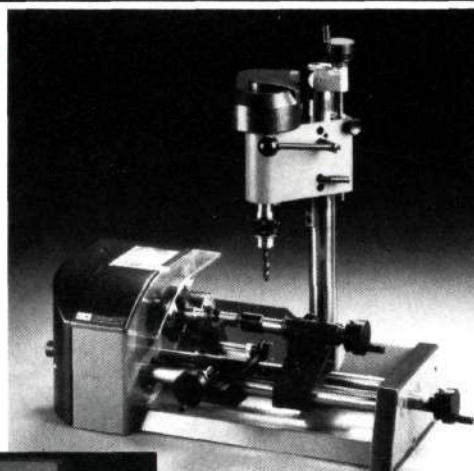
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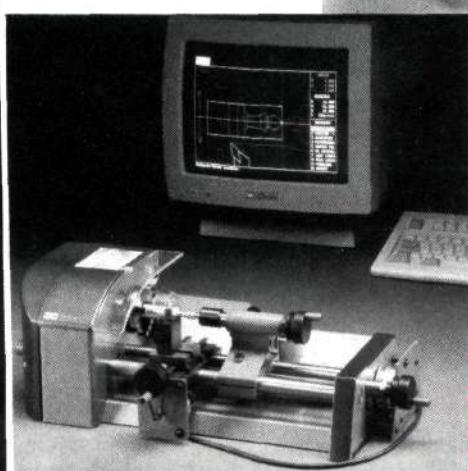
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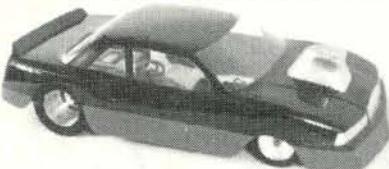


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(Continued on page 174)

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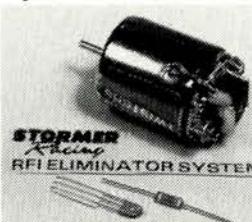
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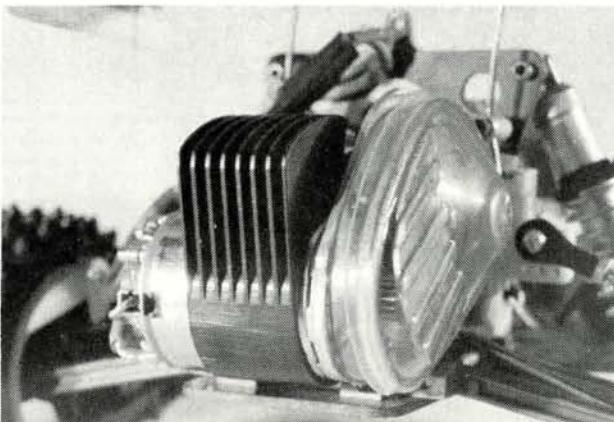


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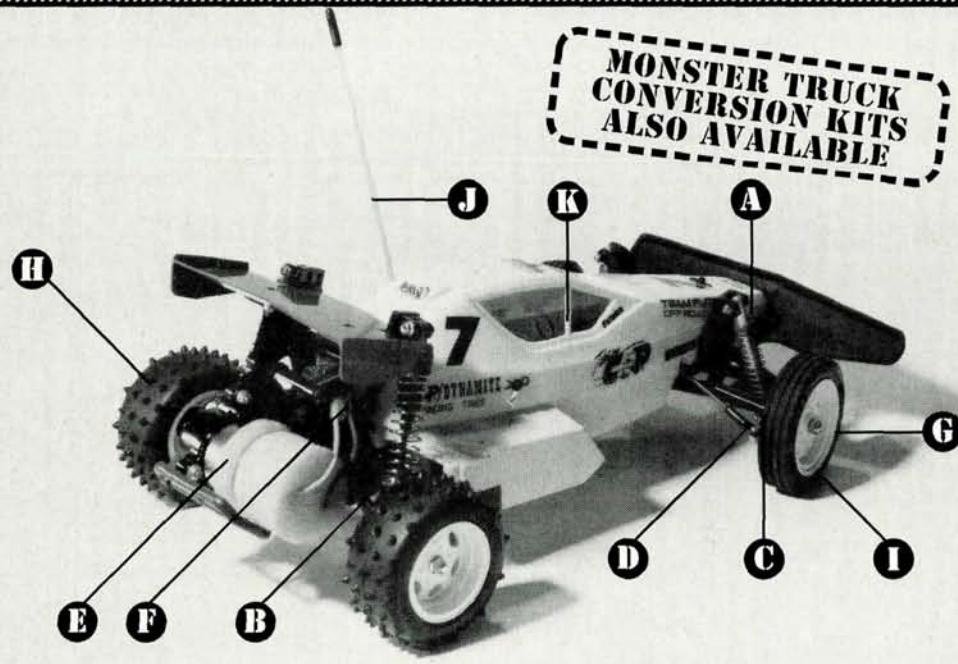
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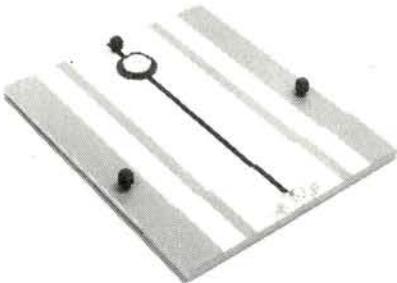
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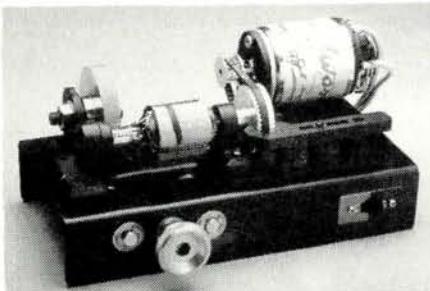


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Price: \$99



Ultima Gears

Trinity recently introduced its new underdrive and overdrive gear kits for the Kyosho Ultima. These precision 48-pitch gear sets are designed for specific motor applications in which the stock gearing isn't compatible with the motor. The underdrive sets are ideal for modified motors; there are three available combinations, depending on how hot your wind is. The overdrive kits are ideal for larger, faster tracks for which taller gearing is needed. Both types are color-coded for easy identification.

Price: \$27.95

For more information, contact Trinity Products Inc., 1901 E. Linden Ave. #8, Linden, NJ 07036.



TWINN-K Setscrews and Wrenches

For all those times you've lost tiny setscrews and couldn't find them at your local hardware store, Twinn-K offers 3mm setscrews and a wrench to fit Tamiya, Kyosho and Team Losi JR-X2 pinion gears.

Part no. 0180 (to fit Tamiya and Kyosho), \$2.25/set.

Part no. 0181 (to fit Team Losi JR-X2), \$1.75/set.

For more information, contact Twinn-K Inc., P.O. Box 31228, Indianapolis, IN 46231.



TAMIYA/MRC Mad Cap

Tamiya's new Mad Cap promises hours of carefree enjoyment, and, when you're ready to meet the challenge, it becomes a high-level racer.

Tamiya engineers selected a strong, sturdy, non-flexing, ABS plastic-resin bathtub chassis, and a 4W independent, double-wishbone suspension with adjustable long-throw coil springs. The transmission uses a precision differential gear set and will accept 16- to 23-tooth pinion gears (the 23-tooth gear is standard). The power goes from a 540 motor through a 3-step speed controller with forward and reverse.

The Mad Cap can be upgraded using sealed ball bearings, CVA or Hi-Cap oil-filled dampeners, Dynatech or Technigold motors, and other Tamiya spare hop-up parts.

Price: \$160

For more information, contact the MRC, 200 Carter Dr., P.O. Box 267, Edison, NJ 08818.



BUD'S RACING Motor Holding Jig

Tired of electric R/C motors rolling around or vibrating across your workbench? Here's the solution: Bud's motor-holding jig is ideal for regular maintenance tasks. Soldering capacitors, motor leads, or brushes is no longer a headache, because the jig holds the motor steady (but not so tightly that it's difficult to get it in and out). This jig is also great for breaking-in your motors or for using with motor dynos. It's light and compact, so it's easy to take to the track.

Price: \$4.95

For more information, contact Bud's Racing Products, 52435 Rt. 113, Dept. RCCA, Wakeman, OH 44889.



PARAGON Formula 1 Motor Spray

This superior blend of high-quality Formula 1 motor spray will rid your motor of particles and brush deposits and thereby increase its power, performance and longevity. Not only does it yield higher rpm than other popular sprays, but its effect also lasts longer when racing. An adjustable nozzle, which regulates the volume of spray, is included as a bonus. A catalog with information on all Paragon products is available for \$2.

Price: \$6.95

For more information, contact Paragon Racing Products, Dept. CA2, 690 Industrial Circle So., Shakopee, MN 55379.

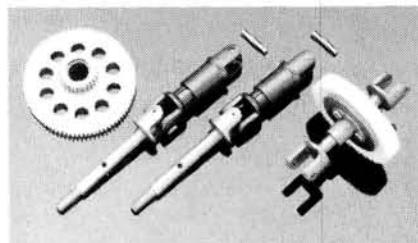


RACER'S CHOICE HyTech

Most bearing cleaners have a petroleum distillate base, which may dissolve old lubricants, but does little to remove the most common causes of bearing failure, namely soil and rubber-tire dust. Racer's Choice has the answer—HyTech Bearing Cleaner. With the powerful cleaning action of all-natural fruit ingredients, HyTech removes dirt, grit, soil, worn-out lubricants and even rubber-tire dust.

Price: \$6.95

For more information, contact Racer's Choice R/C Products, Inc., P.O. Box 405, Medinah, IL 60157.

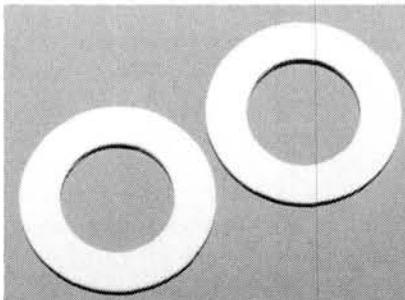


ROBINSON RACING Blackfoot Diff

Attention, Blackfoot drivers! Robinson's new ball-diff kit lets you pull the maximum performance from your truck. The computer-designed adjustable ball diff and axles are made of hardened steel for heavy-duty performance. The machined gears (made in the same way as Robinson's World Champion machined spur gears) allow for smoother operation, which means more consistent handling and extended run times. Also included are telescopic drive shafts, which significantly reduce friction and smooth suspension action for more responsive handling.

Available as a complete kit (Part no. RRP5000), or as individual parts.

Price: \$79.50



Gold Diff Rings

Robinson Racing has introduced the titanium nitride plating process to the R/C industry! These diff rings are part of Robinson's new Titanium Gold line; their incredibly hard surface not only allows for extended life, but it also makes diff operation much smoother.

Price: \$4.50/pair

For more information, contact Robinson Racing Products, 165 N. Malena Dr., Orange, CA 92669.



VENTURE RACING Body Trim

Venture Racing has developed a bright body trim that not only adds pizazz to your R/C vehicle, but also protects the paint from chipping, strengthens the body and prevents it from slicing the foam tires. This easy-to-apply trim wraps around the edges of any polycarbonate body (on all types of R/C car). It comes in a variety of colors, including black, red, white, blue and yellow, and it's sold in 5-foot rolls.

Price: \$2.95

For more information, contact Venture Racing, 1615 9th St., Lewiston, ID 83501.



CRAIG MODEL CO. 23T Altered Roadster

The 23T has a one-piece body with a modern canopy and a rear wing with side fins. This combination is adjustable for a variety of wheelbases, and it will fit most chassis. Zoomie-type headers are available; hemi engine sold separately.

Price: \$17

For more information, contact Craig Model Co., 19515 SH 249, P.O. Box 142, Houston, TX 77070.

WHAT'S NEW

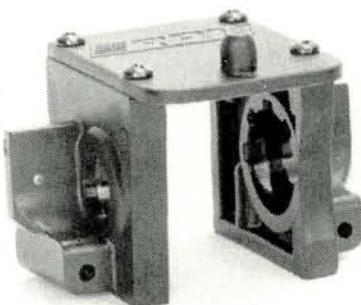


DAHM'S Devastator

Dahm's Mustang Devastator dirt-oval racing body fits the Dominator, the SRP-1, the Kyosho Slingshot and most other 1/10-scale oval racing cars, oval conversions and on-road race cars. It has low, aerodynamic, wedge styling; a hood scoop with air cleaner; and a low, asymmetrical driver's compartment. The Devastator includes finishing instructions and a Dahm's decal sheet.

Price: \$20.98 (clear); \$34.98 (painted).

For more information, contact Dahm's Racing Bodies, P.O. Box 360, Cotati, CA 94931-0360.



RPM Yokomo Bulkhead

The RPM Yokomo rear bulkhead is made of tough molded nylon, and it has a 3-degree caster angle. The shock tower is tilted at the same angle, so the shocks will work straight up and down without any binding caused by misalignment.

The five-position adjuster lets you take the slack out of the rear belt as it stretches because of stress and heat, and it won't affect the wheelbase or the rear-end alignment.

Price: \$22.95

For more information, contact RPM Custom Engineered R/C Products, 14978 Sierra Bonita La., Chino, CA 91710.



CRP Posts and Spacers

Whether you're mounting a body on a monster truck, off-road, or on-road car, CRP's new universal body posts (with hex-shaped head) make it easy. They provide a solid mount that's very resistant to breaking. Two sizes of spacer are included.

Part no. 2529

Price: \$2.99



Rear Wheel Adapter

Designed to adapt monster-truck wheels to the Ultima and other Kyosho cars that use similar wheel mounts, these adapters can be used with CRP 4126 rims and CRP4208/4209 tires, or stock Blackfoot/Monster Beetle tires and wheels. Use them with CRP1714 axles.

Part no. 1715

Price: \$9.99

For more information, contact Custom Racing Products, 3250 El Camino Real #B3, Atascadero, CA 93422.



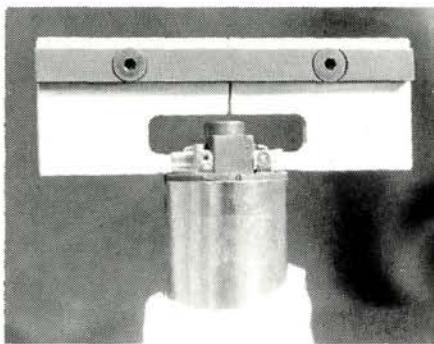
MULTI-WELD Silver Bearing Solder

Multi-Weld takes the frustration out of soldering and makes repair jobs fast

and easy. This silver bearing solder comes out of its syringe applicator in paste form and needs no flux. Heated by a match or lighter, it flows smoothly, and when cool, it can be washed off to leave a clean, corrosion-resistant joint. Multi-Weld is an excellent conductor of electricity, and it can be applied to most metals, except aluminum, magnesium and pewter.

Price: \$4.49

For more information, contact Du-Bro Products, 480 Bonner Rd., P.O. Box 815, Wauconda, IL 60048.



FaST RACING Brush Hood Alignment Tool

Even if your new motor was perfectly aligned at the factory, the first time you loosen the screws to change the brushes, that alignment is destroyed. For years, modified racers have known that aligning the brush hoods keeps their motors running as closely as possible to factory specs: FaST Racing Products now makes this possible for stock motors.

This tool allows you to align the brush hoods of a stock motor easily to exactly 180 degrees. It's produced on a computer-controlled milling machine using top-quality materials to ensure exacting tolerances.

Part no. F201

Price: \$39.95

For more information, contact FaST Racing Products, 4320 Puddlerock Rd., Prince George, VA 23875.

(Continued on page 196)

WHAT'S NEW

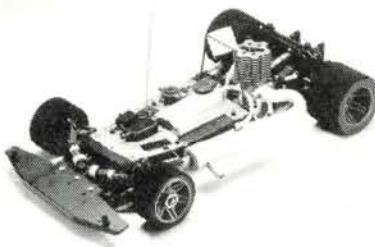


DURATRAX On-Road Tires

DuraTrax offers new foam tires in three compounds that match any track condition. The yellow compound, which provides maximum traction, is great for carpet and drag racing. Green is the best all-around compound for asphalt, concrete, carpet and hard-dirt oval. Blue is the hardest compound and can survive tough tracks.

These tires are interchangeable with all standard BBS tires and wheels. They're available pre-trued and mounted on BBS wheels, or separately as donuts and wheels.

Price: \$4.50 to \$15.95



KYOSHO BMT 891 4WD

Kyosho releases yet another World Champion—the BMT 891! It took five of the top 10 spots (including 1st) at the 1989 1/8-scale On-Road IFMAR World Championships in Holland.

The BMT incorporates the very latest in R/C technology, with innovative adjustable, geometric, proportional front and rear double-wishbone suspension. This design, which hasn't been available in any other R/C car, allows racers to adjust their suspension to any surface.

The two-speed gearbox, the clutch and the ball differential are all factory-installed and precisely adjusted. The BMT has a 4mm-thick Duraluminum flat-pan chassis, four Kyosho oil-filled shocks, 20 ball bearings, a fuel tank, a

wing and a full set of high-grip-sponge racing tires. A body, a .21-size engine and a 2-channel radio are required.

Price: \$669.95

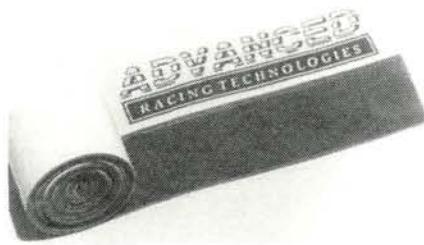


Precision Motors

The latest in high-tech, all-out racing motors are now available from Kyosho. These three precision motors have wet magnets; 35mm-thick, 62-ply rotors for increased efficiency; ball bearings; thicker motor cases; anodized-aluminum end bells; and heat sinks for effective heat dissipation and longer life. Each is machine-wound, has adjustable timing and meets ROAR specs.

Price: \$79.95

For more information, contact Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.



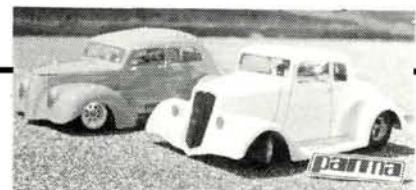
ADVANCED RACING TECHNOLOGIES Servo Tape

Don't risk losing your radio gear! ART's servo tape is just the thing for mounting the steering servo and other components on your car; it's resistant to vibration and motor sprays, and it sticks like crazy.

Part no. 2005

Price: \$2.50

For more information, contact Advanced Racing Technologies, 460 Cypress La., Suite F, El Cajon, CA 92020.



PARMA 1/10 Classic Bodies

Parma introduces two hot additions to its line of 1/10-scale classic bodies: decked out with Parma graphics decals are the '37 Ford sedan (rear) and the '33 Mr. Gasket Willys (front). Both have the fine detail you expect from Parma Lexan bodies.

Price: \$19



Sports Pack

New this fall from Parma International are 6- and 7-cell Sanyo 1300mAh sports packs. Both have safety caps to prevent accidental shorts, and a Tamiya plug for easy removal. You'll notice the increase in run time!

Part no. 11254, \$30; no. 11255, \$35.

For more information, contact Parma International, 13927 Progress Pkwy., N. Royalton, OH 44133.



AEROTREND Parallel Wire Harness

This harness doubles your run time by allowing you to connect two *similar* battery packs to your speed controller. Effectively wired in parallel, two 1200mAh packs will yield the run time of a 2400mAh pack.

Part no. 3902

Price: \$5.99

For more information, contact Aerotrend, 31 Nichols St., Ansonia, CT 06401.

(Continued on page 198)

WHAT'S NEW



McALLISTER RACING Monster Ford

The latest Ford truck style is perfect for stadium racing, monster truck bashes, or crushing through the neighborhood. It comes complete with cab fairing, rear spoiler and exposed four-barrel carbs.

Price: \$20

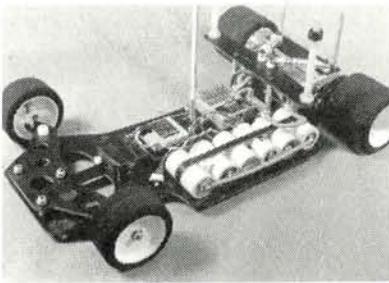


California Mini

You've seen those low-riding Toyotas or Nissans cruising the boulevards; now McAllister Racing has them! Pop one on your 1/10-scale pavement chassis and let 'er rip! (Boom box not included.)

Price: \$18

For more information, contact McAllister Racing, 2245 First St., Unit 105, Simi Valley, CA 93065.



BOLINK Eliminator L.T.O. Chassis

For oval racing (left turn only), this Eliminator 10 graphite chassis has mounts on its left side for six batteries. All standard Eliminator 10 parts fit.

Price: \$60

For more information, contact Bolink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.



HYPERDRIVE Kyosho Mid Optima Kit

Hyperdrive Racing (maker of efficient, vibration-free belt-drive systems) now offers a kit for the Kyosho Optima Mid and Turbo Optima cars. It consists of four motor pulleys (11 to 14 teeth), two differential pulleys (62 and 64 teeth), two belts (70 and 72) and a differential pulley adapter. Reverse-wind stock or modified only.

Part no. HY 1009

Price: \$59.95



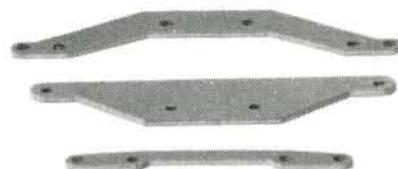
Hypertorque Diff

The Hypertorque Diff uses the same high-quality graphite axle as the Hyper 10 car. This unit is designed as a direct replacement for Delta, TRC, Composite Craft, Lazerlite, Bolink, Agitator and other cars that use the pro-style diff. The Hypertorque Diff can be used with the Hyperdrive belt system or any 64-, 48- or 32-pitch gears.

Part no. AC 0201

Price: \$85

For more information, contact Hyperdrive Racing Systems, Inc., 3210 Howard Nickell Rd., Fayetteville, AK 72703.



BULLET RACING Shock Towers

Made from .084 graphite, Schumacher XLS shock towers are light and strong. Also available is a graphite Schumacher chassis for mod and stock.

Part no. 1204

Price: \$14.95



Mid Slipper Clutch

Bullet Racing's new slipper clutch for the Optima Mid protects the drive train and allows for a smoother transfer of power. Ball diffs become damaged when they're not adjusted properly. Bullet's slipper clutch allows you to tighten the diff enough to prevent the rings from slipping, while providing a way to control the amount of power getting to the ground. (BRP also offers a slipper for the Top Cat, MIP and JR-X2.)

Part no. BRP 5050

Price: \$39.95

For more information, contact Bullet Racing Products, Inc., 14435 Tomball Pkwy., Houston, TX 77086.

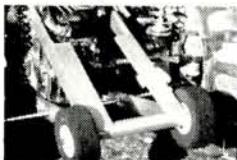
Descriptions of new products appearing on these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by Radio Control Car Action, nor guarantee product performance or safety. When writing to the manufacturer about any product described here, be sure to mention that you read about it in Radio Control Car Action.

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(Continued from page 210)

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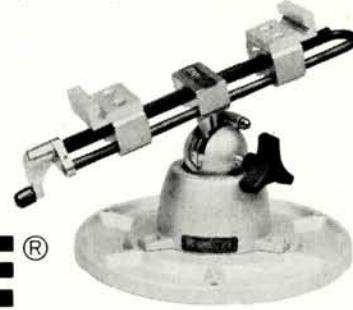
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